The MINING CONGRESS JOURNAL

Volume 9 FEBRUARY, 1923 Number 2

The Truth About Money

MONEY is the life blood of industry and commerce. The countries of central Europe with enormous natural resources and man power are demoralized, degraded, almost helpless and appealing to America for aid, largely because of a lack of a stable currency medium.

Metallic money or paper based on a proper metallic reserve will command public confidence. Fiat money never has and never will command public confidence to a greater extent than the credit rating of its issuer, based upon its metallic reserves.

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Fifth—Such federal cooperation through research and investigation as will solve those problems of production, treatment and transportation which are essential to the highest development of the Mining Industry.

Sixth—A solution of the economic problems underlying the coal industry.

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THE MINING CONGRESS JOURNAL

FEBRUARY, 1923

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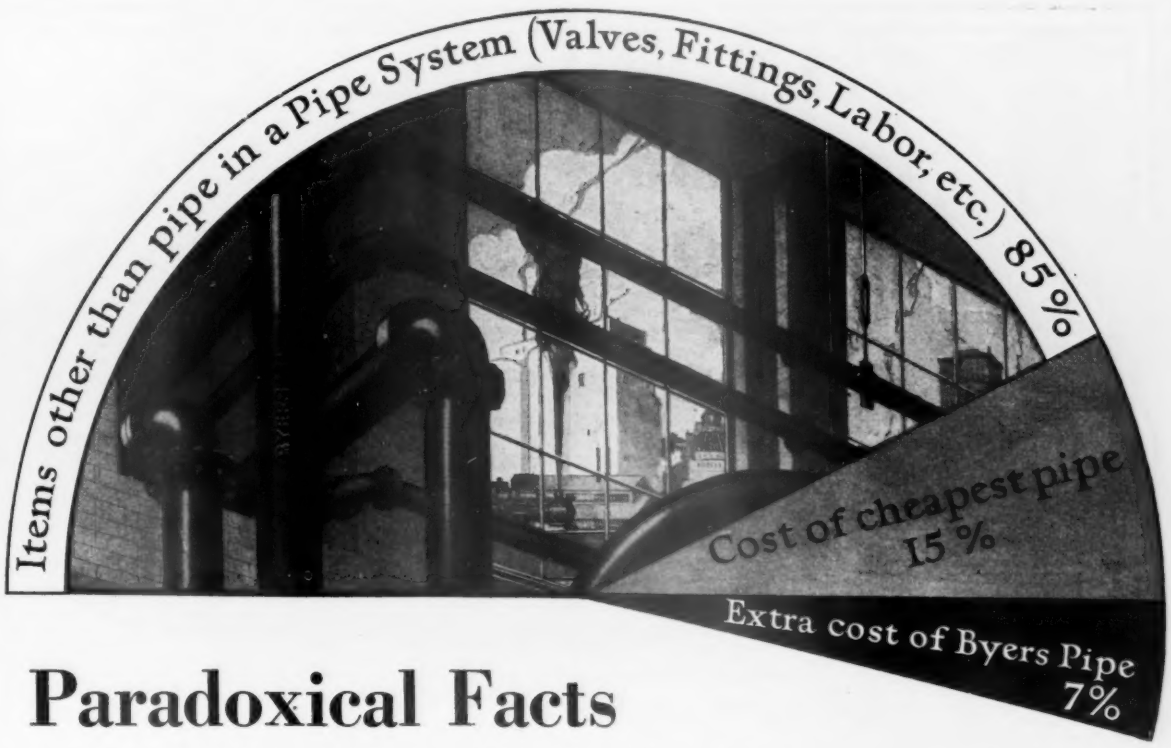

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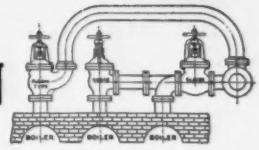

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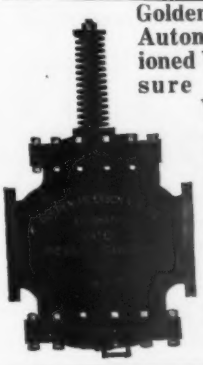

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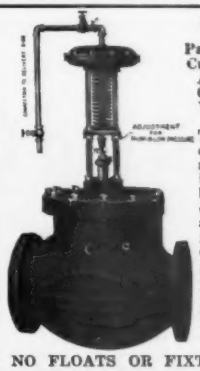

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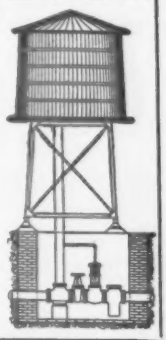

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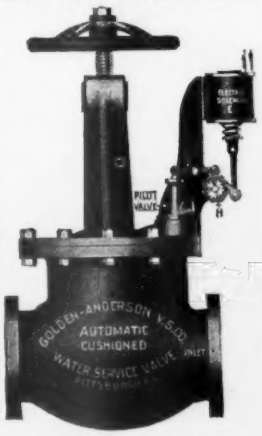

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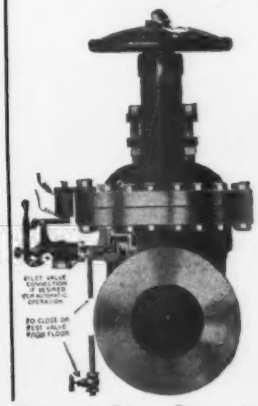

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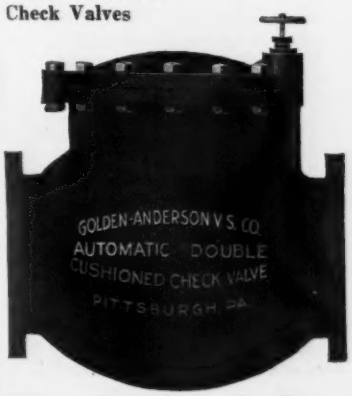

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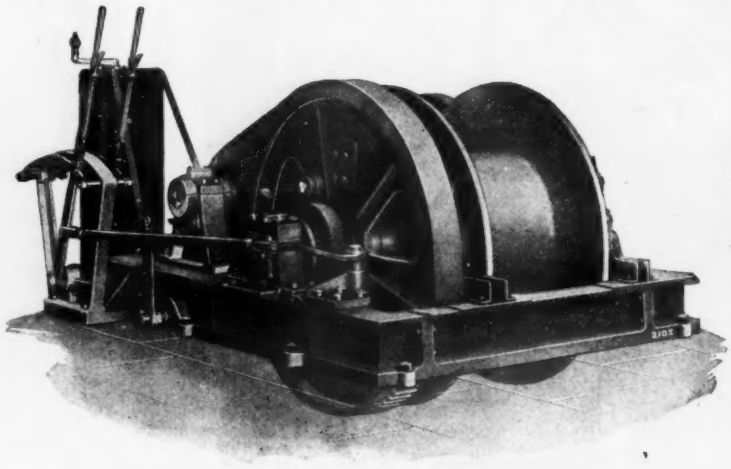

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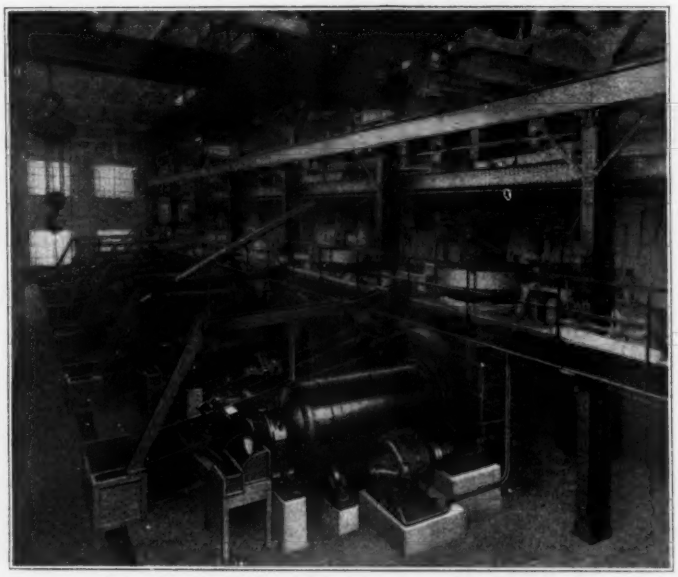

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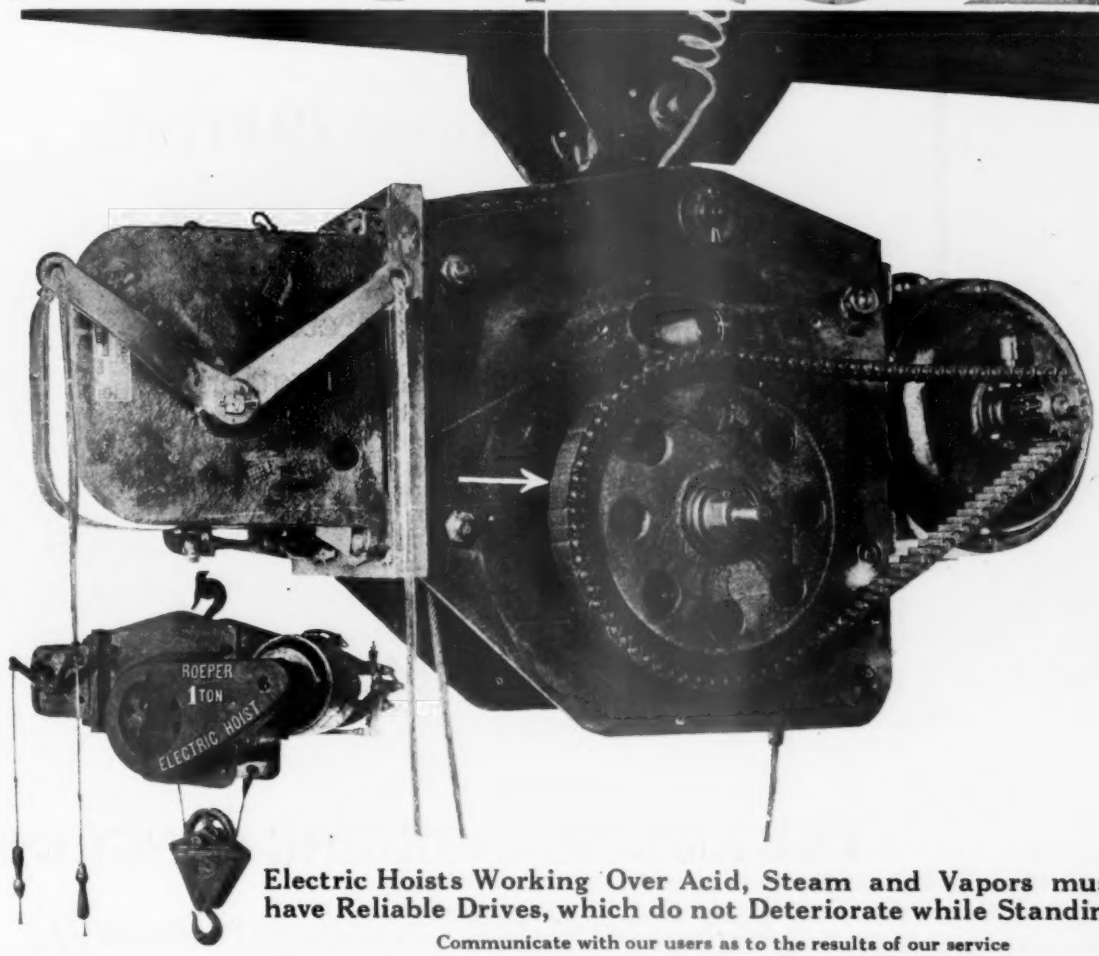

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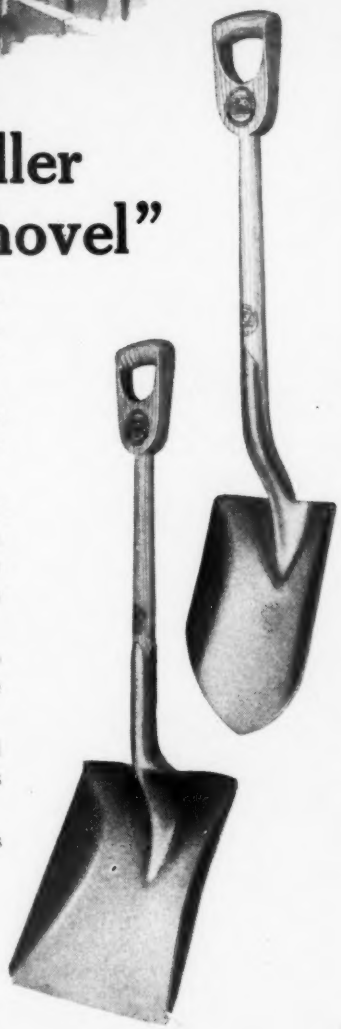

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ARBITRATION

THE PRINCIPLE of requiring that all disputes which affect the public interest or which interfere with the public peace shall be submitted to some unbiased and regularly constituted agency for decision is a fundamental basis of government. The chief purpose of a government is to protect its citizens as a whole against dangers from the outside and protect each of its citizens in his rights as against his neighbor.

Disputes naturally arise between individuals as to their respective rights and privileges. Government establishes courts to which those who believe their rights are infringed may appeal for redress. Not only are courts established for the purpose of permitting the right to appeal thereto when individual rights have been trespassed upon but the law permits no other method of determination excepting agreement of the parties.

In the general development of our affairs a certain class of contestants have undertaken to settle their disputes out of court and gradually the contention has been developed that certain disputes are not subject to the rule of the court, not matters of compulsory arbitration.

When organized capital was sufficiently strong to dictate in disputed questions it stood firmly against any law requiring compulsory arbitration. This attitude was unfair and justified organized labor in so equipping itself as to be able to win in its contest with organized capital.

Were only the parties to such contests involved MINING CONGRESS JOURNAL would say, well and good, and that organized labor having so strengthened its own influence as to be able to dictate, that its right to do so was equally as good as the right of organized capital had been when it was able to win by force. Unfortunately, however, there is a public interest which is greater than the interest of either organized labor or organized capital. While it is true that the direct results of a strike or lock-out are first felt by the parties to such a contest, always indirectly and frequently directly, the public at large is damaged even more greatly than the parties to such contention.

That third element—the public—has rights which are equally sacred and equally entitled to consideration—that party which is prohibited from taking the law into its own hands has a right to insist that all other parties shall be required to abide by similar rules. It may well be stated by organized labor that organized capital having lost the power to exercise control that it has no right now to complain and that he who employs the sword should perish by the sword.

The great public interest, the interest of our government and the ultimate interest of every constituent part thereof requires that force shall not be employed by disputants but that all shall be required to submit to the orderly determination of their disputes by agencies which are a part of the government.

GOVERNMENT AND BUSINESS

THE GOVERNMENT of the United States does many things well. In nearly all of those responsibilities which were placed upon government by the Constitution, its average performance is satisfactory. The Constitution never planned the government to be a business agency, but anticipated that its citizens should conduct the business, hampered only in such ways as was necessary to protect the rights of others. It maintained its general control over highways because these were interstate business facilities and this control was to be exercised only so far as it was necessary to permit its citizens to do business over those roads without discrimination. It was never planned that the government should operate railroads. Had this been intended the government would have provided for executive management. Not only was it not intended that the government should enter into business transactions, but this plan has been definitely proved to be wise by every excursion which the government has made into business operation. According to the Railway Age, the cost to the government of its attempt to operate the railroads during the twenty-six months of governmental operation was $1,141,520,452. The first six months of private operation, during which the government guaranteed against a deficit, because of the bad condition in which the railroads were turned back to the private owners, another deficit was created amounting to $536,000,000, making a total deficit due to government control of $1,677,520,452. In other words, the deficit for the twenty-six months' period of governmental operation will be about $44,000,000 monthly, while the guarantee of the standard return during this period of thirty-two months will make a deficit of practically $52,000,000 monthly. Before the war, a continuous conflict was in progress to require the railroads to accept lower rates for transportation service because of the belief that their profits were too large. During the war, with a largely increased business, a largely increased freight rate and conditions under which the profits would have been enormous if efficiently managed, the railroad transportation service of the country created a deficit which amounts in round numbers to practically one-half of all taxes paid to the federal government during any one year. This deficit—a burden upon the taxpayers of the country—amounted to practically three quarters of a billion dollars annually during that period, a period during which because of the enormous traffic, the increased business available for the railroads, ought to have earned for those railroads an enormous profit. This record should stand as a final argument against the government operation of railroads.

THE DISGRACE OF ORGANIZED LABOR

AT NO TIME has there been any reasonable belief that the men guilty of the horrible crime at Herrin, Ill., would be convicted nor is it surprising that there was a unanimous verdict of the jury. In the face of all the circumstances surrounding this crime, it would require an extremely courageous man to stand out against the local conviction that plain murder is altogether too good for either scabs or those who are not willing to violate their oaths as jurymen to protect organized labor. Almost certain punishment would have come to any juryman who had stood for a different verdict. The Government of the United States will fall far short of its duty if it permits the continuation of a state government so impotent that it is unable to punish so dastardly a crime. Twenty-one persons whose chief crime consisted in an effort to earn a living at honest work, were brutally murdered in broad daylight by a mob consisting of the larger part of the people living in that community. This wholesale crime is to go entirely unpunished because a majority of the citizens of that community believe that the demands of organized labor should be superior to the rights of other citizens, superior to the law and superior to the government. And in the face of this horrible situation comes the attorney for the United Mine Workers of America with the astoundingly audacious statement: "It was the only righteous verdict which could have been rendered, and it ought to be the birth of a new era in the industrial disputes in America and the abolishment of the use of hired gunmen in controversies between capital and labor." And what are hired gunmen? Nothing more and nothing less than watchmen placed upon the property to guard it against possible vandalism. A policeman on his beat is a paid gunman. His duties are, so far as possible, to prevent the commission of crime either against person or property, arrest offenders and turn them over to the proper courts. Policemen are provided to protect the property of the public because there is a possibility of criminal invasion of the rights of the citizen. In the case of the strikers, whose places are taken by nonunion men, there is not a possibility but a dead certainty that lawless acts will be committeed to prevent operation by nonunion men. The history of union labor is a history filled with criminal offenses of this kind. In no case has the punishment been adequate to the crime committed.

McNamara was punished for the destruction of the Times Building in Los Angeles and the murder of a score of men, but he was not adequately punished. In no case, of which the writer has knowledge, has organized labor undertook or assisted in the prosecution or conviction for crime where beyond all question horrible crimes had been committed by someone. Who then is guilty for the murder of twenty-one helpless victims at Herrin? Organized labor would have us believe that these men killed each other, or that the operators themselves hired gunmen to go to Herrin and kill their workmen in order to make a case against organized labor. In the McNamara case, organized labor had blazoned the country with its contention that the prosecution of McNamara was an attempt on the part of capital to find a victim and they undertook to raise a fund of $200,000 to defend this innocent defendant, this victim of capitalism, from conviction of a crime to which he confessed when faced with positive evidence of his guilt. The MINING CONGRESS JOURNAL believes that the organization of labor is a necessity, that labor properly organized could not only serve its own purposes but the purposes of the country at large in a largely beneficial way, but unless organized labor is willing to help the authorities in the prosecution of crime, unless it is ready to rid itself of the justified charge that it is a criminal organization, the time will come when the patience of the public will be exhausted and a determined effort will be made to crush organized labor. If that time shall come, there will be no possible question as to the result. While one county of a state may override the law of the state and the nation, in the end a small minority of the people of this country will not be able to control the whole, whenever that whole shall organize to rid itself of every criminal organization.

While the horrors of the Herrin, Ill., massacre still hold a place in the mental picture galleries of people who love and respect law and order and common decency—elements which were utterly lacking in the mob of miners who perpetrated those horrors, there is presented to the public view another picture with its setting in North Arkansas.

This picture discloses a scene of industrial warfare and sabotage which long has interfered with the operation of a railroad and the industrial pursuits of law-abiding citizens dependent upon that railroad for their prosperity and means of livelihood It shows a small group of striking workers interfering with and trampling upon the rights of thousands of people, and a condition of affairs which the local governments seemed powerless to overcome, with the result that a large majority of the citizens in the locality affected took matters into their own hands and applied drastic measures to remedy the situation.

How different were the motives which spurred the citizens of North Arkansas to action from those which inspired the bloodthirsty Herrin mob to murder and property destruction! The former sought the restoration of law and order. The latter flaunted law and order to gratify passions of violence and hate. The former decreed the right of individuals to work unmolested if they wanted to work. The latter denied the right of individuals to accept employment except where and when authorized by a union. The purpose of the former was to prevent another Herrin affair.

Without attempting to justify the citizens of North Arkansas in taking summary action against persons who were interfering with their liberties and the peaceful and necessary operation of their industries, it is reasonable to conclude that when the constituted agencies of governments fail to afford adequate protection to their citizens against encroachments upon their public and private rights by minority groups of disgruntled workers and law-breakers, public sentiment is certain to burst into some definite form of public demonstration.

In North Arkansas a "citizens' committee," reported to have been composed of more than fifteen hundred respected and generally law-abiding citizens of the communities affected, was called into being to stamp out the unbearable conditions imposed upon them by a small group of strikers whose respect for law and order, property rights, and the right of an individual to work when and where he pleased, was secondary to personal grudges, and union affiliations.

The Herrin mob and their sympathizers were highly indignant when it was reported that a fund would be raised to prosecute the murderers. The same mob or their ilk, personified in the group of law-breakers in North Arkansas, are reported now to be attempting to raise a fund of $3,000,000 to prosecute members of the "citizens' committee" of North Arkansas for daring to stamp out the sabotage, arson, and industrial warfare along the line of the Missouri and North Arkansas Railroad.

The demand of Mr. Gompers for the restoration of

law in Arkansas is a righteous demand and all patriotic citizens—at all times make the same demand not only for Arkansas but for every other state. These citizens have desired but have not expected Mr. Gompers to make the same demand for the punishment of crime in Illinois.

"Properly constituted government in the State of Arkansas," says Mr. Gompers, "can vindicate itself only by a speedy determination of responsibility and an adequate and quickly determined punishment for those guilty of one of the worst atrocities of our time." Mr. Gompers declared that: "Men were forced to surrender union cards and sign up to return to work on the railroad or get out of the country."

This is indeed a bad state of affairs but compare it with Herrin. There, instead of being asked to go to work, which they were anxious to do, they were brutally murdered and their bodies mutilated by a cowardly set of miscreants including the officers of the law and practically the whole community.

And these brutes, these contemptible cowards, these wanton murderers are being defended by the attorneys of organized labor and we feel safe in predicting that none of them will ever be punished. We have not yet heard Mr. Gompers demand that the guilty at Herrin shall meet "an adequate and quickly determined punishment."

THE GYPSUM DECREE

OPINIONS DIFFER as to the importance of the consent decree entered on January 3 in the federal court for the southern district of New York, which disposes of the suit brought by the Department of Justice against the Gypsum Industries Association alleging violations of the Sherman Act. The decree dissolves this association only, but expressly authorizes the organization and maintenance of a corporation to carry out certain defined objects. It perpetually enjoins the association or any of its members or anyone acting for them from making certain agreements and doing certain acts.

The effect which this decree may have upon other similar suits can not be foreseen, since the defendants in such suits may prefer to have judges determine the application of the statutes to their particular cases, rather than to have their attorneys agree to terms which the Attorney General is willing to accept, such as those stipulated in the Gypsum case. The terms of the Gypsum decree may indicate how far the present Attorney General is willing to go in making concessions which will secure settlement of such litigation, but the decree itself binds only the parties to the agreement, and is valid only so far as the parties to be affected thereby are before the court and give their consent.

If this decree can be relied upon as a proper basis for future activities of trade bodies generally, such organizations, besides being incorporated, would be restricted to certain defined objects and purposes. The decree does not forbid certain activities in promoting the use of gypsum products, such as research, publicity, and advertising, and does not prohibit educational and experimental work, services in dealing with transportation questions, efforts to secure improvements in methods of plant and mine operation, or the maintenance of a credit information bureau.

Beyond reflecting the attitude of the present Attorney General regarding trade activities, the Gypsum decree has no special significance. It is assumed that any association which keeps within the limits prescribed would not be charged with violation of the Sherman Act under the present regime of the Department of Justice. An Association which does not go beyond such limits probably would not be interfered with had the Gypsum decree not been entered. At most, it can be considered merely as a guide to future conduct which will not run afoul of the Sherman Act.

GOVERNMENT AND THE HERRIN MASSACRE

THE PROPOSAL to prosecute as conspirators under the provisions of the Sherman Anti-trust law those who are responsible for the failure to convict the Herrin wholesale murderers will not satisfy the public conscience. Such offenders are guilty as accessories after the fact. A wholesale killing of defenceless workmen cannot be condoned by prosecution under the anti-trust laws.

Twenty-two men were deliberately and brutally murdered by a mob consisting of two or three hundred men, each of whom is guilty of manslaughter and most of whom are guilty of premeditated murder.

It is no excuse for this colossal crime that a majority of the people living at Herrin were members of the United Mine Workers of America and were anxious to prevent coal production and by that course freeze the nation into submission to the demand of that organization.

It is no defense to this crime that no jury could be selected from that county among which some would not be found whose allegiance to the labor organization would be stronger than his allegiance to the government and who would refuse to return a verdict of guilty—no matter how conclusive the evidence might be; it is no satisfaction to know that the lawless public sentiment of that community was so strong and defiant that its threats would put in jeopardy the life of any juror who returned a verdict in accordance with facts as established by the testimony.

Is it to be made possible for the citizenship of any single municipal division of our governmental structure to create an "*Imperum in Imperio,*" a "state within a state" and defy the law of the land, murder those who interfere with their unholy plans, jeopardize the lives of jurors who dare to return a verdict in accordance with the evidence and thus force colossal failure of justice?

If this can be tolerated law breakers generally may take courage, establish their own bailiwicks and make themselves immune from punishment no matter what the crime. If wholesale murderers are to go unwhipped of justice surely the lesser offenses can easily escape through the medium of a community majority of criminals.

Surely there must be means by which this condition may be averted.

A failure to convict and punish those who were guilty of the murder of twenty-two non-union miners at Herrin, Ill., on June 21 last will be a complete failure of Republican government in that state; a complete forfeiture of the agreement entered into by that state with the national government in consideration of the granting of its statehood right.

The most cold-blooded wholesale murder of citizens that this country has ever witnessed during peace times is to go unpunished. Surely some means must be found for the punishment of such crimes if our government is to endure. Organized labor must withdraw its defense from this, the foulest of crimes, if it expects ever again to have the respect of the public. The state must find means of punishing known murderers, else it will justify federal action to maintain organized government and protect the lives and liberty of her citizens.

THE RAILWAY SITUATION

THE POSITION of the railroads of the country is one to be seriously considered. Handicapped by a cumulation of experiments in government supervision and regulation, railroad executives have found it impossible to initiate and carry out plans which would strengthen the transportation service. Uncertainty as to future legislation also has retarded the voluntary adoption and execution of constructive measures for improvements and betterments, and has discouraged the investment of the new capital which is necessary for expansion to meet the public demand.

The continuation of a policy of government interference and experimentation will further weaken the railroads, particularly where such a policy deprives private management of its initiative and responsibility in providing adequate service. Herbert Hoover, in his annual report as Secretary of Commerce, warns the government of the social and economic disaster which would result from nationalization of the railways; and yet there are powerful political groups which seek to bring about this result.

Railroad executives have been charged with wanton mismanagement in order to discourage the tendency of the government to attempt the solution of the transportation problem through legislation. This attitude seems fallacious. Such charges emanate from sources far removed from the agencies which seek to promote intelligent and constructive development of railroad service in a way that will protect the public and at the same time give the carriers a square deal.

There are political groups which make a business of circulating vicious propaganda for the purpose of winning public support for their nationalization schemes. These groups and their purposes must be exposed. The reports of the Interstate Commerce Commission, the Secretary of Commerce, and other administrative agencies which deal with the railroad situation do not sustain the charges of wilful mismanagement or wanton neglect on the part of railway executives; and the unreliable statements which emanate from biased sources should be definitely rejected in favor of the authoritative reports of the government's agents.

Although further experimentation is considered dangerous to the welfare of the country, it is generally agreed that the consolidations contemplated by the Transportation act, whereby weak and strong roads will be grouped into larger systems, will improve the general situation and perhaps go far toward solving present difficulties. Basicly, however, the matter of rate regulation is of paramount importance. The adjustment of rate levels to the point where the greatest volume of traffic will move freely is a goal for which both the public and the railroads should patiently strive. Additional legislation is not needed to bring about such an adjustment, as its consummation should be possible under the powers granted to the Interstate Commerce Commission by existing statutes.

PLUG THE LEAKS

THE MINING INDUSTRY is deeply concerned with conditions which retard the prosperity of the farmers. Their contributions to the maintenance of governments, the volume of their freight traffic over the transportation systems of the country, and their ability to purchase modern farming machinery and agricultural implements, directly affect the prosperity of the mines.

Wasteful practices and wilful pessimism are aggravating the depressing conditions which confront the farmers, particularly in the western states. Prone to brood over conditions which they cannot control, farmers generally, and especially in the west, are neglecting to conserve resources which are most vital to their welfare.

They are being led and bled by malicious propagandists while thousands of tractors, reapers, threshers, binders, headers, and other costly farming machinery, implements and equipment deteriorate in the fields—a harbor for birds, or a roost for domestic fowls.

The annual loss on one tractor, reaper, binder, threshing machine, or header, due to improper care, in many instances exceeds the farmer's tax bill. The annual loss sustained in the agricultural industry by reason of wasteful practices in handling and failure to shelter such equipment is enormous.

By the elimination of this waste, by sharing the optimistic outlook which is stimulating other lines of industrial activity, and by cooperation with those engaged in other basic industries, the agricultural industry can insure a greater degree of prosperity than would be possible otherwise.

Cooperation of those engaged in the basic industries is necessary to prevent tax reforms which will increase the burden of taxation; to obstruct unnecessary increases in public indebtedness and expenditures; to promote a better understanding of the problems confronting all basic industries; to foster a more uniform distribution of labor; to secure an equitable adjustment of freight rates; and to elect to public office officials who will serve their constituencies efficiently and without discrimination.

Farmers must recognize the inter-dependence of agriculture, mining, manufacturing and transportation. The prosperity of one is dependent upon the prosperity of others. Each should eliminate wasteful practices and wilful pessimism that all may enjoy the full benefits of the dawning era of prosperity.

THE NICHOLSON SILVER RESOLUTION

NO ONE commodity has been the cause of more political discussion and the basis of more different arguments than silver. Possibly no other subject at this time carries so many unanswered questions. The relations of silver to world normalcy is regarded by many as one of the most vital questions of the day.

It is plain that the gold supply of the world as compared with the world's indebtedness and the world's business transactions is very much less than during the normal period before the war. Is the use of silver for money a fundamental necessity in world stabilization?

The Nicholson Resolution (S. Con. Res. 31), now before the Senate, provides for the appointment of a commission to investigate the world silver situation.

The present condition of the currencies of European countries and the fact that sufficient gold to stabilize those currencies cannot possibly be made available for a long time to come and the further fact that the psychology of public confidence in its currency systems requires a metallic base, justifies the theory that the silver of the Western Continent, Canada, the United States, Mexico and South American countries, may probably furnish a basis upon which world stabilization may be based.

It is greatly hoped that Congress will immediately, through the enactment of the Nicholson bill, provide for a thorough investigation of this subject in order that the facts may be available upon which a proper conclusion may be reached as to future action.

SILVER LOOMS IN AFFAIRS INTERNATIONAL

Impending Expiration of Pittman Act Focuses Attention on Problems Affecting Nations Throughout the World—Metal Seen as Stabilizer for Europe—Investigation Proposed By Measure Before Congress

By Ira L. Smith

MANY INTERNATIONAL complexities left in the wake of the war must be untangled within a few months or a situation involving the trade welfare of the world will revolve around the production of silver and the market for that metal. Unless farvisioned moves soon are made, expiration of the Pittman Act next fall will leave the western hemisphere economically unable to mine its vast deposits of silver while at the same moment the eastern hemisphere will be crying for hard money with which to stabilize its finances. With desperate demand existing on one side of the world and natural desire to produce on the other, the silver industrv feels that some means can be found by which its product may move across the seas.

Basis For Action

It is in this spirit that Congress is being asked to authorize an intensive study of the entire situation. Upon the results of this study, it is planned to base a movement that will revive world trade, bring restored confidence in European finances that have been sorely afflicted since the war, and provide incidental solution for the problem confronting the silver industry of this country.

Investigation is Proposed

The purchasing power of the Pittman act, under which 270,000,000 ounces of silver are being purchased at a set price of one dollar an ounce, will expire early in the coming fall. At that time, according to the most expert opinion, the full amount of silver sold to Britain will have been returned to the United States Treasury and the world market will find seventy or eighty million ounces annually thrust upon it. Unless a definite movement is initiated, the London controlled price will drop because of the increase of silver thus put upon the market, close students of the situation declare.

This movement would point itself toward a halting of present tendencies of foreign countries to debase the silver in their subsidiary coinages and establishment of world demand for the metal. Achievement of these purposes must be accomplished if trade is to be brought back to its normal trend, for gold resources have only been able to show a flicker of an increase while the obligations of the nations of the world have reached astounding volume. Thus it remains for silver to satisfy the sweeping demand for a metallic reserve to back almost fabulous debts which mere paper cannot settle.

An outline of the tendency on the part of foreign governments to debase or abandon the use of silver in their coinage shows that Sweden, Norway and Denmark have discontinued the use of silver coin for all fractions of the krone, substituting an alloy of nickel and copper. A summary of the debasement activities shows the wide extent to which they are being practiced. England has debased its silver coinage from 925 to 500 fine; Netherlands and the Dutch Indies have made a similar cut from 945 to 720 fine; Canada, from 900 to 800 fine; Honduras, from 900 to 500; San Salvador, from 900 to 500; Singapore or Straights dollar, from 900 to 600, and later to 550. Mexico and Peru, both silver producers, have debased their currenies to 500 fine.

In addition to these evidences of debasement and abandonment, economic

conditions of themselves have been responsible for the disappearance from circulation of silver coins in the following countries:

Austria, Belgium, Bulgaria, Czechoslovakia, Finland, France, Germany, Greece, Hungary, Italy, Jugoslavakia, Poland, Portugal, Rumania, Russia, Turkey and many other smaller countries.

In England, the debased coins, readily distinguishable by color from those containing silver 925 fine, circulate freely with the older coins containing 80 percent more silver.

The Body of the Problem

The problem resolves itself into the devising of means by which foreign policies will be so molded and overseas demand for the metal so established that the domestic production will be able to swing into the open market with a minimum of embarrassment, thus providing Europe with the silver she so desperately needs.

Under normal conditions, India and China become "sink holes" for silver, which forms the means of settlement in the export trading of these countries. It follows that the stronger the character of this trading the greater is the demand for silver, and thus enters another variable of no mean consequence, for a typhoon in one country or a famine in the other, not to mention hosts of other influencing possibilities, can at any time knock the best of calculations into a

whole row of cocked hats. Internal political churnings in China during the past year illustrated how still another element hovers around the situation.

The first step in bringing about these conditions has been taken in a legislative move to launch an intensive investigation which will seek to develop such facts as will enable later efforts to be directed intelligently and forcefully. Such an investigation is proposed in the resolution introduced recently by Senator Nicholson, of Colorado, which would authorize creation of a commission to delve deeply into the situation. As introduced, this measure would also authorize the commission to enter into agreements with foreign nations for the purpose of achieving its desired results, but it is hardly possible that this proposal will survive action to be taken on the resolution by the mines and mining committee of the Senate, to which body the proposed legislation was referred upon introduction. Such an authorization would be an encroachment upon the powers of other branches of the government, it is being pointed out, and would draw much opposition to the measure, it is declared.

A similar resolution recently was introduced in the House by Representative Colton, of Utah. The measure first was referred to the Committee on Coinage, but later was transferred to the Committee on Mines and Mining.

Facts are Emphasized

These facts were brought before the committee in testimony submitted during the course of recent hearings held on the Nicholson resolution and in a letter addressed to Senator Walsh, Montana, by C. F. Kelly, president of the Anaconda Copper Company and chairman of the silver committee appointed by the American Mining Congress in accordance with a resolution adopted at its Cleveland convention last year. The list of witnesses who appeared before the committee included F. H. Brownell, vice-president of the American Smelting and Refining Company and a member of the committee headed by Mr. Kelly; Sidney J. Jennings, vice-president United States Smelting and Refining Company, and James F. Callbreath, president and secretary, respectively, of the American Mining Congress; Prof. W. J. Jenks, Ravenal MacBeth, and H. N. Lawrie.

Mr. Brownell outlined for the committee the general situation abroad in respect to the silver demand, explaining England's policy concerning the backing of paper rupees in India with silver, and pointing out the effects of the debasing of the British subsidiary coinage in silver content from more than 925 to approximately 500 fine.

Mainly, the committee was told, efforts for the welfare of the silver industry of the United States must seek to bring about maximum silver reserves for India and a return to the high silver content in the British coins, with a simultaneous drive to move exportations of silver to China up to the top notch and hold them there.

Particular emphasis was placed upon the result of the debasement of the silver coins by England, it being shown that many nations throughout the world, even those reckoned as large silver producers had followed this move, seeking by this artificial method to build up their reserves. Failure by foreign nations that have taken this move to swing back to the pre-war silver content of their subsidiary coinages, will cut a great swathe in the world demand, the Senate committee was told, with the result that production will heap up on an idle market until demoralization results and silver operations cease.

India's Important Role

The part which India plays in the general scheme of these matters is highly interesting. For a number of years before the war the Indian rupee held the arbitrary ratio to the English sovereign of 15 to 1, with the silver rupee and the convertible rupee note being freely circulated, together with a fair representation of sovereigns. To stabilize this ratio, a gold reserve was built up in London. With the rise in the price of silver after 1914, however, rupees were rapidly absorbed in India, and, in the words of an official consular report to the United States Department of Commerce from its representative at Calcutta, "the convertible rupee notes were only saved from a state of declaration of inconvertibility by the passing of the Pittman Act." This provided flow of silver into India missed far in solving the situation, however, and led finally to a change by Britain in the rupee ratio from 15 to 10 rupees to the sovereign.

In short, the history of the financial situation in India shows the well-recognized necessity that the British Government keep the paper notes well backed with silver, the alternative being confusion in trading with still graver political possibilities should faith in the paper notes be lost in the colony to any extent. The tendency on the part of the natives to hoard silver, as is the order of affairs in China, of course, is a factor that adds to the demand made by the situation upon the keen attention of Britain.

Willingness is Seen

The Senate committee was told the feeling of close observers is that England is anxious to act in sympathy with the United States in financial matters related to this subject, and that because this country is the source of so great a portion of the silver of the world it is highly likely that Britain will cooperate in moves which will have the final result of aiding the silver mining industry. Lest this recited willingness to cooperate be mistaken as altruistic and discounted in practical discussion because of being placed in that light, experts constantly swing back to the fact that silver forms a basic element to be used by Britain as a means of maintaining peaceful conditions in India. She must of necessity so frame her policies that the mines of this country may bring that metal to the surface in a steady flow, is the natural development of the thought by those who hold their fingers close upon the pulse of the situation.

Control of the world price of silver by London is another factor receiving marked attention at the present time. Britain controls the price of silver because she controls the exchange involved in the vast amount of trading carried on with India and China. It results that the western hemisphere, producing the vast majority of the world's silver, must bow to the dictation of price by the eastern hemisphere. This price control can not be brought across the seas to the United States, experts say and Mr. Brownell told the committee, unless the production of this country to be withheld from the market for a considerable length of time, estimated as at least six months. So great would be the tie-up of finances involved in such a move, however, that the silver industry has viewed it as hardly possible without a modification of trade combination restraint laws to the point where silver producers might join for the effort. It was pointed out to the committee, in addition, that the New York financial interests, when approached on the subject of aiding the financing of such a plan, stated that security based upon silver operations was not sufficient to back up a deal of such magnitude.

Against Artificial "Fixing"

In this connection domestic producers feel that the price of silver should be the direct reflection of the balance between supply and demand, rather than the result of an artificial "fixing."

Testimony before the committee indicated, however, that there would be an inclination found among silver producers to offer less objection to the control of price in London provided Britain, because of the several points cited, enter into some type of cooperative effort under which, perhaps, interests on this side of the ocean would guarantee to give preference to her demands for silver at any time that conditions in India or any other situation of stringency arise. Britain's part in such an arrangement

would be to abandon her policy in respect to the paper rupee notes and their relation to the reserve, and that she take the lead in actions which will exert her influence in raising the base of silver used in the subsidiary coinages of the world. Under this plan, the silver industry of the United States would stand much in the same light as a bank ready to help another bank in the event of a run on the institution.

Still another interesting phase is presented in the outline of attitude held by the soviet government of Russia toward silver in coinage, as given to the committee by Mr. Brownell. During the revolution the treasures of churches totaling vast amounts of silver, were seized. This silver still is held by the government, which has disposed to large degree of its gold. It is evident that the soviet would hold a sympathetic attitude toward any move to give silver as prominent a place in world coinage as possible, having itself eventually to come to a sounder currency basis than that which it now possesses.

The part which silver most logically should play in connection with the establishment of a financial foundation in Germany was outlined to the committee by Mr. Callbreath. Initiating his statement by calling attention to how the decline of the English sovereign punctured the British boast of many years that her gold set the standard for the world, Mr. Callbreath went on to point out that an increase in the financial obligations of nations from forty-three billion dollars before the war to the present mark of three hundred billion dollars has been accompanied by only a slight increase of gold reserves, which accordingly have come to be placed under a severe strain. To relieve this strain, felt most directly by Germany and other European countries whose printing presses have been grinding out notes worth hardly more than the paper on which they are printed, silver obviously must be used because a sufficient supply of gold is not available.

"If there is any one obligation outside our boundaries which rests upon us as a nation more than another," declared Mr. Callbreath, "it is to assist in the stabilization of exchanges in financially upset countries in order that they may not only do business with themselves upon a profitable basis but that they may do business with us."

No Increase in Reserves

"While the obligations of nations have mounted high since the war, the gold reserves of the world have not been materially increased," Mr. Callbreath pointed out, and continued:

Senator Nicholson, Colorado, and Representative Colton, Utah, have introduced the "silver commission" resolution in their respective houses of Congress. Senator Pittman, Nevada, an authority on silver, is the author of the silver-purchasing act, which soon expires. Senator King, Utah, has introduced a bill proposing additional purchases of silver at $1 an ounce.

"In our own country in 1919 we used up for other than monetary purposes eighty million dollars worth of gold, nearly thirty million more than the amount of gold produced during that year from our mines. Contrasted with such conditions is the fact that we have but little more gold in the world than at the beginning of the war. In the meantime we have taken from foreign countries gold to the value of one and a quarter billion dollars or more. So it seems absolutely necessary that those foreign countries if they are ever able to get upon a stable monetary basis must use silver as subsidiary coinage and as a basis for currencies, if the confidence of the public is to be regained."

Mr. Callbreath impressed upon the committee the fact that any action it may take should not be put forward essentially as an aid to the silver mining industry but should take on a much broader scale—one of international aid—if it is to be successful. "If the purpose of such action would be merely to raise the price of silver, the resultant legislative proposals should not be passed by the American Congress," he declared.

Senator Pittman, of Nevada, author of the law which soon is to pass out of effect, laid emphasis before the committee upon his view that the Nicholson resolution should be so revamped as to make its proposal such that an inquiry into the silver situation would be made much on the order of the congressional investigation of the problems of the agricultural interests.

An investigation of this type will find masses of valuable information at its disposal as a result of the requests made by Senators Pittman and King of the Commerce and Treasury Departments for information on the subject. At the time the hearings were held several reports already had been sent to Capitol Hill by the Commerce Department which had received them from its consular agents in foreign lands, and it was stated that the Treasury Department was making fast progress on its reports concerning the coinage and economic phases of the situation.

Senator Nicholson very frankly stated that the measure as he introduced it simply was intended as the basis for legislation, being merely the block out of which would be carved the finished proposals. Following the hearings it was evident that the committee would eliminate most of the language in the resolution devoted to explanation of the situation and also the proposal to grant the commission powers to deal with foreign countries.

Ravenal MacBeth, representing the Idaho Mining Association and other mining interests of the Northwest, outlined to the committee the effect which expiration of the Pittman Act would have upon the silver mining industry if no offsetting efforts were soon to be launched.

INDUSTRIAL COOPERATION MOVE IS SPREADING

Organization of State Committees of Mining Congress' Newly Created Division Proceeds With Speed—Separate Committees for Coal and Metal Mining in Each State—Reports to be Coordinated for Annual Sessions

THE FIRST nation-wide movement to be made by a major industry for the purpose of creating increased cooperation in its industrial relations has been initiated by the mining industry and already has gained marked progress. Organization of the Division of Industrial Cooperation of the American Mining Congress is the means by which this movement is spreading throughout the country.

Although the new division was created by the Mining Congress only a few short months ago, its frame-work already has been practically completed, with state organizations for both the metal and coal mining industries in some instances at work in their local fields as a part of the national body.

The Division's Aim

Mainly, the division aims to secure a greater cooperation between employers and employes in the mining industry by means of educative efforts. Before the organization's more advanced functions are set in motion, however, a discerning study will be made of conditions in all parts of the country, after which the data secured by this broad investigation will be used as a basis for the main efforts.

The study will be made in all mining districts simultaneously by state organizations consisting of separate committees for the metal and coal mining operations. Many of these committees already have been appointed, and the others stand with their personnel practically completed. In some instances meetings already have been called and the study is well on its way.

Under the outlined procedure, each state committee, consisting of two members and the chairman, submits its report to the chairman of the metal or coal section, as is the case, who in turn correlates this report with those coming from each of the other states and submits the resulting document to the national chairman of the division, W. A. Grieves, of the Jeffrey Manufacturing Company, Columbus, Ohio. Each year the work of the division will be reviewed and plans for new work laid at the annual industrial relations conferences to be held in connection with each convention of the American Mining Congress.

The State Committees

The committee lists completed to date follow:

Norman C. Schlichter, secretary, Industrial Department, International Committee of Y. M. C. A., honorary chairman.

Charles F. Willis, formerly welfare expert in the Phelps-Dodge Corporation, chairman, Metal Section.

Alabama—Coal: E. L. Elliott, Yolande Coal & Coke Co., chairman.

Arizona—Metal: Chas. F. Willis, chairman.

Colorado—Coal: A. H. Lichty, in charge of welfare, Colorado Fuel and Iron Co., chairman.

Metal: Geo. H. Stahl, chairman.

Illinois—Coal: J. D. Zook, Nason Coal Company of Chicago, chairman.

Indiana—Coal: G. A. Van Dyke, Sterling-Midland Coal Co. of Indianapolis, chairman.

Kansas—Coal: C. B. Spencer, Southwestern Interstate Coal Operators Assn., chairman.

Kentucky—Coal: Frank D. Rash, St. Bernard Mining Co., chairman; K. U. Meguire, Harlan Coal Co.; C. F. Richardson, West Kentucky Coal Co.

Missouri—Coal: Fred Lukens, president, Farmers Fuel Co., chairman.

Montana—Metal: J. L. Boardman, welfare, Anaconda Copper Company, chairman.

New Mexico—Coal: Powell Stackhouse, Jr., president, Carthage Fuel Co., chairman.

Nevada—Metal: Emmet D. Boyle, Governor of State of Nevada, chairman; F. W. Ingram, State Labor Commissioner; H. M. Rives, Nevada Mine Operators' Association.

Oklahoma—Coal: J. G. Puterbaugh, president, McAlester Fuel Co., chairman.

South Dakota—Metal: E. S. Irwin, employment manager, Homestake Mining Co., chairman; Otto Ellerman, state mine inspector; William A. Reamer, Trojan Mining Company.

Tennessee—Metal: Howard I. Young, American Zinc, Lead & Smelting Company, chairman; M. C. Caine, Tennessee Copper Company; Jos. H. Taylor, Ducktown Sulphur, Copper & Iron Company.

Bulletin to be Issued

In a word the immediate aim of the division is the correlation of all available information on the various welfare systems now organized in the mining industry, both coal and metal, and the publication of a bulletin carrying this information to be distributed to the industry as a whole, and particularly to those companies who initiate work of this character within their organizations.

While in many industries a real solution of the labor problem has been worked out, it also is true that only a small percentage of employers view this matter from any other standpoint than by meeting force with force, by the hailing of the courts into situations, and by attempts to force surrender of minorities. To move toward the point where these forces will be counteracted is the advanced aim of the division. The movement, officials state, is not an altruistic one, but rather takes on the character of a "practical idealism." The practicality of the effort is shown in the fact that it does not attempt to exert itself toward its ideals until a thorough study of the situation has been made.

New Era Seen

Careful observers of mining conditions in Alabama expressed themselves as seeing the opening of a new era in relationships between mine owners and miners in that state when the first meeting of the local coal committee recently was held. A later meeting was called and served as the occasion for development of a more definite program. According to the tentative outline, it is proposed first to tabulate all activities among the miners along the lines of first aid and rescue work being done, also further to ascertain definitely what now is being done in Alabama for the miners in matters of education, recreation, entertainment, and moral and religious environment. The securing of this data will link with the general plan of the division to gain a foundation upon which more advanced efforts will be built.

STANDARDIZATION ISSUE

The April issue of the Mining Congress Journal will be devoted to standardization work in the mining industry. Special articles by authorities connected with this campaign will cover the activities of the Standardization Division of the American Mining Congress, while leading Government officials concerned with Federal efforts to "squeeze waste out of industry" will outline the work of various bureaus and agencies thus engaged. Concrete summaries of progress already made by standardization efforts in the mining industry, a history of the movement, and plans for the future all will be presented under the names of authorities.

ELLIS ISLAND BARS TIGHTLY DRAWN ON LABOR

Legislators Listen to Arguments Advanced by Industry for Modification of Immigration Act, But Make Plain Stand Against Taking Action—Plight of Mining Operations in Michigan Outlined During Hearings

THE IMMIGRATION COMMITTEE of the House has listened to pleas made by representatives of various industries, including mining, for modification of the 3 percent immigration act for the purpose of allowing additional skilled labor enter this country. But the Committee will not go beyond the "listening" stage in this connection—at least not for many days.

"About all you'll get in a legislative way between now and March 4 is the plugging up of holes—if you're lucky" was the observation of Chairman Johnson, of the Committee, to James A. Emery, Council for the National Association of Manufacturers, in referring to the move to prevent entry of undesirables into the country and to hasten naturalization. This statement, coming from the head of the Congressional Committee before which had been presented industries' plea for more skilled workmen, illustrates the mood of that body so far as any plan to loosen the provisions of the immigration act is concerned.

Suggests Preferment

During recent hearings held by the Committee, S. L. Lawton, representing the copper mining interests of upper Michigan, laid before the Committee the proposal that skilled and semi-skilled labors be placed on what is known as "the favored occupation list," which includes actors, physicians and immigrants of light type. Mr. Lawton further suggested that skilled miners not only be allowed to enter the country without respect to the quota regulations but that the contract labor rules be waived in their instances.

Presenting to the Committee conditions existing in one segment of the mining industry—typical in varying degrees of the handicap facing mining operations throughout the country—Mr. Lawton declared that the Michigan copper mines have lost two-thirds of their miners to the automobile industry and require ten thousand additional men immediately, stating that their rolls now list only five thousand men. Mr. Lawton also favored amendment of the 1917 immigration regulations to permit the Secretary of Labor, in event of labor shortages, to permit entry to this country of skilled and semi-skilled miners beyond the provisions of the act.

Drained by Other Industries

The testimony was bolstered additionally by Mr. Lawton's outline of the drain which other industries make upon the mines' lists of skilled workmen. He cited an immense turn-over among the miners in Northern Michigan, attributable, in large part, to progress made by the miners in accumulating savings and buying and operating farms within ten to fifteen years after they come to this country. Approximately 80 percent of the foreign-born miners in the Northern Michigan mines, he stated, are naturalized citizens and 40 percent own their homes.

Questions propounded by Committee members to Mr. Lawton and other witnesses, including Mr. Emery and J. M. Larkin, assistant to the president of the Bethlehem Steel Corporation, indicated the evident policy upon which the legislators have settled, which may be summarized in the statement that they would prefer to have industry weighted down somewhat by a labor shortage rather than lift the bars. Some members of the Committee implied their belief that an increase of wages would form a magnet that would attract sufficient labor to industrial operations without importations from abroad, but witnesses took issue with this view.

Merely a Gesture

The hearings held early in the month were little else than a gesture, if gaged by the Committee's attitude, for it seemed apparent that, while representatives of industry would be afforded an opportunity to express themselves, an atmosphere akin to that of prejudgment existed.

Mr. Emery presented to the Committee the following recommendations drawn by a committee of the National Association of Manufacturers:

"1. That in fixing the quota of each nationality of otherwise admissible aliens under the present law, due regard should be given to ascertained annual emigration of such nationality. Thus, the Italian quota under the law last year was 42,000. Substantially 40,000 Italian immigrants entered the United States—53,000 emigrated. Thus, while the Italian quota was apparently satisfied, there was a large actual deficit. In other words, Congress ought to fix the quota in terms of net immigration.

"2. The Secretary of Labor ought to be authorized, upon the presentation to him of satisfactory evidence of a continuing shortage of labor of a particular class or type, to admit otherwise admissible aliens in excess of the quota until, in his judgment, such condition is improved. This provision would permit no change in the standards of admission, would leave the key to the immigrant gate in the hands of the Secretary of Labor. The proposal completely answers those who say there is no labor shortage by requiring those who assert it to demonstrate the fact in concrete terms to the Secretary of Labor.

Examination Before Sailing

"3. Provision should be immediately made to provide for the physical examination of otherwise admissible aliens through a detail of officers of the marine hospital service or other appropriate United States medical officers at the point where passports are vised, or at convenient points of embarkation. This provision could, of course, be waived by our government where satisfactory assurances were given by the country of immigrant origin that physical examinations required by United States law have been made and the result certified.

"Unless provision is made for the ex-

Photo copyright, Major Hamilton Maxwell.

amination of aliens before they embark, the best class of aliens will not risk denial of admission upon arrival in the United States. The cost of transportation is nearly double what it was before the war in terms of American dollars.

"Upon a careful examination of the whole question, your committee sees no other practical remedy for the existing situation. It, therefore, asks immediate authority to proceed to execute the proposed suggestion in cooperation with many other important industrial and agricultural associations, whose cooperation is assured."

REVENUE PROPOSALS ARE PLACED ON SHELF

House Ways and Means Committee Follows Treasury Department's Recommendations in Adopting Policy—Reintroduction Needed to Gain Further Consideration

FOLLOWING recommendations of Treasury officials in their annual reports, the Ways and Means Committee of the House of Representatives has decided that no bills affecting revenue, except those of an emergency nature or of direct assistance to the Treasury in the administration of fiscal affairs, shall be reported this session. This means that most of the bills now pending in the committee will have to be reintroduced in the next session of Congress in order to receive further consideration.

Among the bills now pending in the committee, which will come up in the next session, is one introduced by Representative Frear, of Wisconsin, to provide adjusted compensation for veterans of the World War. This bill proposes reenactment of the war-profits and excess-profits taxes, effective January 1, 1922, on every corporation which derives a net income of more than $10,000 from any government contract or contracts made between April 6, 1917, and November 11, 1918, and provides for a new tax for 1917 and subsequent years on corporation profits not distributed in the form of cash dividends. Provision is made for the exemption of income derived from the mining of gold. The proposed rates of tax on undistributed profits in excess of a specific deduction of $3,000: 5 percent of the amount of such excess not exceeding $20,000; 10 percent of such amount not exceeding $100,000; 15 percent of such amount not exceeding $200,000; and 20 percent on all of the excess above $200,000.

The fact that the Frear bill carries the soldier bonus proposals which have gained wide support as the result of the activities of the American Legion may cause the new Congress to give it serious consideration. No prediction can be made as to the probable attitude of the Ways and Means Committee toward the tax features of the bill until it is definitely known who will be appointed to fill the vacancies which will occur when the present session adjourns.

Another bill which probably will receive early consideration at the next session is that introduced by Representative Tincher, of Kansas, which would permit net losses sustained by taxpayers during the year 1920 to be deducted from their net incomes for the preceding taxable year, or the succeeding taxable year to the extent, if any, that such net losses are in excess of net income for such preceding taxable year. Inasmuch as existing revenue laws provide for the deduction of net losses sustained during 1919, 1921 and subsequent years in a similar manner, it is not expected that the Tincher bill, which in effect removes a discrimination against taxpayers who suffered losses in 1920, will meet with serious opposition.

The decision of the committee to defer action on revenue measures now pending before it should meet with general approval. During recent years the uncertainty occasioned by constant tampering with the revenue laws has been a disturbing factor in the efforts of business to regain its poise. A temporary respite of even one year will permit adjustments of conditions which otherwise might not be possible.

SPONGE IRON TESTS ARE SUCCESSFUL

SPONGE IRON STUDIES being made by the Bureau of Mines have progressed to the point of proving the chemical possibility of reclaiming iron from smelter dumps and slug piles in the west in such large quantities as to hold promise of providing a substantial ferro supply for that section of the country. Experts who have been making semi-commercial investigations of this subject at the bureau's Seattle station recently applied the process which they have developed to a quantity of leached ore from the dump of a California copper mine, being a calcine obtained from pyrite. Experts declare that it now remains only for the commercial feasibility of this operation to be proven, when metallurgical practices having effects approaching revolutionary character will be put into effect along the Pacific Coast and in some of the western states, where, at the present time, there is no local iron industry. As taken from the dump, the ore contains sulphur, zinc and copper not extracted by previous sulphuric acid treatment. Roasting in a sintering machine removes all but the sulphur, the product then being crushed and subjected to treatment in the magnetic concentrator and the sponge iron furnace developed by the studies conducted by the bureau's experts. Melting in an electric furnace follows, and the result is metallic iron.

Since ore in the dump from which the sample recently subjected to treatment was procured contains at least 50 percent of iron, the possibilities of this newly-developed method are apparent, especially since metallic iron not only is produced by the process, but the zinc and copper also are separated with an additional possibility of sulphuric acid manufacture.

GIRAND CLAIM DRAWS COLORADO ACTION

POST-TREATY conditions in connection with the development of power resources of the Colorado River have come under a new light as a result of a request made by Governor Weeks of Colorado that the Federal Power Commission take no action upon the application of J. G. Girand, involving a proposed project at Diamond Creek, on the river, until time has been allowed for full action by legislatures concerned in the seven-state pact. Making a direct request for hearings on the subject, the governor found the Federal Power Commission desirous of conferring before the final word would be issued authorizing the sessions.

The end of the past month found the situation hanging in mid-air, the commission having adjourned the meetings at which the subject was to have been taken up without discussing the matter because of a rush of other business. It was made known, however, that a decision on the matter of holding the requested hearings would be reached at an executive meeting of the commission, most likely early this month.

Secretary Hoover is known to be of the opinion that the Girand proposal is not in contradiction with the spirit of the seven-state pact and has his approval, providing Mr. Girand will agree to abide by the terms of the treaty. This, the applicant already has agreed to do. Colorado is the only state to take exception to immediate action by the commission upon the Girand application, basing its action presumably upon an inclination to believe that a grant in this case before the states' treaty is ratified and in effect will set a precedent unfavorable to Colorado in the matter of priority of claims to water in the river.

RAIL RATE AUTHORITIES SLIGHT MINING INDUSTRY

Readjustment of Vast Tariff Network Finds No Move of Consequence Made to Aid Coal and Metal Operations—Broad Generality Used by Interstate Commerce Commission To Dismiss Subject

By McK. W. Kriegh

PRODUCTS OF MINES probably receive less consideration in rate regulation than any other class of traffic, although they furnish in excess of 50 percent of the revenue freight tonnage transported annually by the railroads of the country. Shippers of these products file only a small percentage of the total number of complaints received and considered by the Interstate Commerce Commission. The general rule that manufactured products should take a higher rate than raw products from which the finished products are made, recognized in rate-making as a controlling factor, has not been uniformly and justly applied or the mining industry would now be enjoying its stimulating effects, particularly in the western states, where many producers of low-grade ores are unable to resume operations on account of prohibitive rates.

A Constant Readjustment

Readjustment of the vast network of freight rates is taking place constantly. The Interstate Commerce Commission disposes of thousands of complaints of shippers each year and orders reductions or revisions of rates which it finds to be unreasonable or discriminatory. The Commission attempts to determine in each case what constitutes a just rate, but frequently, as stated in one of its early opinions, the problem is a difficult one, involving multitudinous facts and an infinite variety of modifying conditions, which make the establishment of principles and framing of policies a matter of slow evolution. The evolution of rate-making principles which are applicable in the case of mine products has been especially slow, or else these principles have been disregarded.

In its decision of May 16, 1922, in the matter of reduced rates, the Commission attempted briefly to review the rate situation as it affected the mining and smelting industries. The evidence submitted by the shippers of ores and smelter products to show that the serious depression in their industries were attributable in large measure to the rate increases of 1918 and 1920, was, for the most part, ignored, and the contentions of these shippers were disposed of by the assertion that "until overstocked markets shall have further readjusted themselves, the volume of movement can hardly be materially increased by establishment of any ore and smelter-product rates which would be fairly compensatory to the carriers."

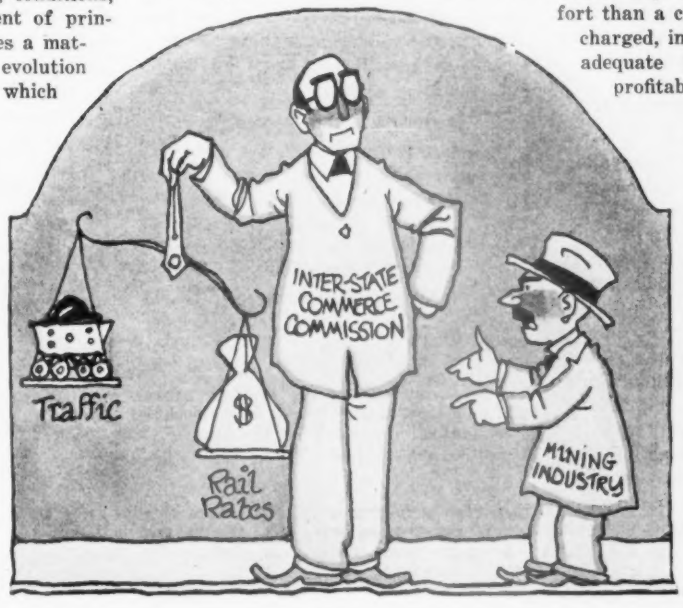
Not Fully Reviewed

Inasmuch as the only pronounced instance of an overstocked market was in the case of copper, it is clear that the Commission, in considering the rates on ores and smelter products, did not review the situation fully and did not give serious weight to the evidence submitted on behalf of the producers of silver, gold, lead, zinc, manganese, and other ores, who furnish or might furnish substantial tonnages to the western lines. This result could have been expected, however, in a case which involved the entire rate structure of the country and covered every kind and description of traffic. If these producers had presented their evidence in a separate proceeding, the Commission's conclusion might have been different, as there would have been no possibility of a misconception of the issues involved or the facts upon which the shippers relied to establish their contentions.

The conclusion of the Commission that the volume of movement could not be materially increased by establishment of any ore and smelter-product rates which would be fairly compensatory to the carriers, is illogical. No rate or rates can be considered compensatory unless traffic moves in substantial volume under them. Perhaps there is no rate on ore or bullion in the western district that can be considered compensatory in and of itself. Whether or not rates are compensatory, especially where they apply to low-grade traffic, depends upon the amount of revenue they contribute to the total revenue of the carriers over whose routes they are in effect. If rates are prohibitive so that they restrict the movement of traffic, they certainly are not compensatory. If they are reduced to the level where traffic will move most freely, although they may not be compensatory in and of themselves, they may furnish sufficient revenue to the carriers to make the total revenue received yield a profitable return. Such rates, however low they may be, are compensatory. Without the revenue derived from them, carriers could not operate their lines with profit.

An Explanatory Illustration

A lawyer may receive several large fees each year, but these fees, although in and of themselves compensatory, might not be sufficient to yield a profitable annual return for his labors. He must rely upon fees from small cases, collections, and consultations, each of which may involve more time and effort than a case in which a large fee is charged, in order to secure an income adequate to make his occupation profitable. This illustration applies with equal force to the railroad rate situation as it affects the mining industry.



It is in the public interest and in the interest of the carriers that rates on ore and smelter products be fixed at a level which will permit the greatest volume of traffic to move and the largest amount of low-grade ore to be extracted. It was clearly established by the evidence introduced in the reduced rates case that existing rates seriously restrict the recoverable tonnage of the mines, force selective mining in the mines which

have high-grade ores and close many mines which can produce only low-grade ores. The economic loss to the country by reason of the waste of vast ore bodies which cannot be profitably utilized on account of prohibitive freight rates is greater than any possible estimate could accurately disclose. Even revolutionary improvements in metallurgical processes and methods of extraction may never restore these wasted ores to the country's resources.

COULD AFFORD INVESTIGATION

Both the Interstate Commerce Commission and the carriers could well afford to initiate an investigation of the rates on ores and smelter products for the purpose of determining whether, and to what extent, if any, this condition could be improved and the volume of traffic augmented by the reduction and realignment of these rates. Such an investigation should not be confined to any particular locality or limited to any class of traffic. The rates on coal and coke used by the smelters should be considered. The relationship of these rates to the rates on all classes of traffic over the same lines should be established.

It is freely predicted that such an investigation, if not limited in its scope, will furnish convincing proof that lower rates on the products of mines not only will stimulate mining, result in renewed activity in idle camps, and prevent unnecessary waste of the country's mineral resources, but will augment freight traffic to such an extent that the entire rate structure of the western carriers, which now produces little or no return and not infrequently shows a deficit, will become compensatory. Such a result would benefit shippers of live stock and agricultural products from the sparsely settled regions of the west, and indirectly would produce a favorable effect throughout the country.

TO DISCUSS REPORTS ON REFRACTORIES

RESULTS OF STUDIES of ceramics from the standpoint of the consumer will be announced and discussed at the meeting of the American Ceramics Society, to be held in Pittsburgh, February 12 to 16, the sessions devoted to this subject being scheduled for the 14th. Experts of the Bureau of Mines will present papers, each reflecting the results of the studies as they apply particularly to various branches of the non-ferrous mining industry.

The metallurgical requirements for refractories from the standpoint of users of electrical furnaces in the mining industry will be covered in a paper to be presented at the meeting by C. E. Williams, superintendent of the bureau's Seattle station. Requirements of similar character for each particular branch of mining activities will be discussed in the following papers: copper alloys, H. W. Gillett, chief alloy chemist of the bureau; aluminum, R. J. Anderson, who has charge of the bureau's studies of losses in casting; iron and steel, F. W. Davis, specialist in ferro investigations; and electrothermic metallurgy of zinc, B. M. O'Harra, who has charge of investigations at the Rolla station.

COPPER SHOWS NOTABLE GAIN FOR 1922

SMELTER production of copper in 1922 was approximately 981,000,000 pounds, an increase of 475,000,000 pounds over 1921, according to the Geological Survey, as compiled from reports of the smelters covering the actual production for eleven months and the estimated production in December. Productive work was resumed by practically all the large mining companies except the United Verde Copper Co. by or during April, 1922, one year from the general shut down of the copper mines. The smelter production of copper for December, as estimated by the producing companies, was 103,300,000 pounds, or at the rate of about 1,240,000,000 pounds a year.

REFINED COPPER GAINS

The total production of new refined copper from domestic sources, determined in the same manner as the smelter production, was about 897,000,000 pounds, 288,000,000 pounds more than in 1921. The refinery production of new copper obtained from domestic and foreign sources, including the imports of refined copper, was about 1,398,000,000 pounds. In addition to the output of new refined copper, about 112,000,000 pounds of secondary copper was produced at the refineries, making the total output of the refineries about 1,510,000,000 pounds.

IMPORT RECORDS AFFECTED

Although the new tariff act placed no duty on copper, it affected the records of the Department of Commerce, in which a line of division was drawn on September 21, when the new tariff became effective. Up to that date the total imports of copper in ore, concentrates, matte, blister, and refined copper amounted to 363,443,226 pounds, of which 75,556,317 pounds was refined copper and 192,050,397 pounds was blister copper. The exports for the first ten months amounted to 634,501,851 pounds. The figures for later imports will not be available until January 15, 1923, but those for later exports will be available somewhat sooner.

The stocks of refined copper in the hands of domestic refineries on December 31, 1922, as estimated by the refining companies, were about 277,000,000 pounds, compared with 459,000,000 pounds on December 13, 1921.

WAR MINERAL CASES ACTED UPON

THE FOLLOWING list indicates claims acted upon and action taken by the War Minerals Relief Commission and the Secretary of the Interior upon war minerals claims during four weeks preceding January 22:

RECOMMENDATIONS FOR AWARDS

(Approved by Secretary Fall)

New Jersey Manganese Co., New York City, $5,334.13; Placer Chrome Co., $35,000; Richard J. Fledderman, Yreka, Cal., $8,369.10; W. A. Cook & Sons, Bonita, Mont., $2,045.93; Southern Minerals Corp., New York City, $23,412.46; Williamson Bros. & Cole, Washington, Cal., $3,187.21; Maynard H. Hunt, Philipsburg, Mont., $1,052.77; Larsen, DeBruce & Olsen, Ephram, Utah, $1,043.04; Western Ore Co., Oakland, Cal., $10,192.18.

(Pending with Secretary)

Ernest A. Hayden, Callahan, Cal., $444; Marcus E. Jones, Salt Lake City, Utah, $381.25; Joan Mining Co., Duluth, Minn., $63,905.79; J. D. Combs & G. W. Stone, Grant County, Oreg., $536.23; R. N. & G. W. Bruce, Emerson, Ga.; Morgan-Leitcher Co., Nevada City, Cal., $6,846.23; Virginia Manganese Mining Co., Bluefield, W. Va., $5,929.69; Cazadero Chrome Co., Sonora County, Cal., $1,553; J. F. Reddy, Medford, Oreg., $54,785.

RECOMMENDATIONS FOR DISALLOWANCE

J. F. McKnight, Eureka, Cal., expenditures for purchase of property; James D. Fine, Dayville, Oreg., no loss sustained; E. T. Heggland, Mina, Nev., no additional award.

	1921	1922
Refinery production from domestic sources	609,000,000	897,000,000
Refinery production from foreign sources, including estimated imports of refined copper	411,000,000	501,000,000
Stocks of new refined copper January 1	659,000,000	459,000,000
	1,679,000,000	1,857,000,000
Exports, including unrefined, black, blister, and converter copper in bars, pigs, and other forms, and refined in ingots, bars, rods, etc	609,000,000	698,000,000
Stocks December 31	459,000,000	277,000,000
	1,068,000,000	975,000,000
Total withdrawn on domestic account	611,000,000	882,000,000

PUTTING RADIO TO WORK IN THE MINES

Communication Through Ground Proven Feasible—Has Definite Possibilities As Aid in Safety and Rescue Work—Further Investigations Are Necessary—Expected To Prove A Boon for Isolated Camps

By Herbert E. Metcalf
Radio Engineer

ONE OF THE first questions that is asked when radio is mentioned in relation to its use in mines is, "Can radio be used underground?" and when the answer is given as "Yes" the questioner is more or less astonished, according to his knowledge of the radio art as it exists today.

Radio waves do penetrate the ground and do travel through the earth much the same way as they travel above the ground. There are, however, certain limitations which tend to absorb the power of the transmitting set when sending underground, but due to the increase in efficiency and sensitiveness of receiving sets, it may be stated with authority that no difficulties are encountered in sending messages from the surface to the bottom of the deepest mine unless perhaps the receiving set in the mine is surrounded by a high metallic content iron ore. Even in the latter case, power could be increased at the sending station so that sufficiently loud signals could undoubtedly be received under the most adverse conditions likely to be encountered. You will notice that the above remarks apply principally to receiving below from a sending set above. The reverse—sending from below to be received above—is a little more difficult, especially in metallic ore mines.

Problem Well Studied

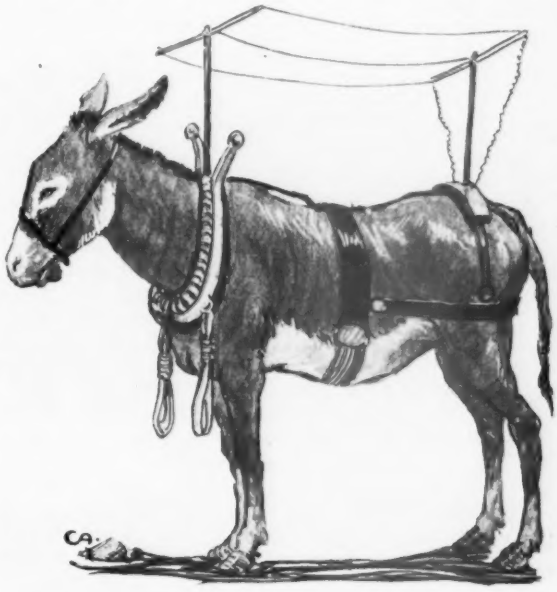
The problem of reception below the surface of the ground, and, in fact, below the surface of the water, has been well investigated. The writer recently read a report of reception at the bottom of a 1,200-foot mine with a narrow shaft using only a 3-foot loop of wire as a means of catching the messages, where readable signals were readily obtained from a sending station in Germany, and many stations in this country were copied as well. The apparatus used in these tests was standard equipment, such as used above ground for loop reception, and no particular attention paid to the portability of the receiving station, or its adaptation to permanent use in mines.

Reception below the water was thoroughly worked out and made practical during the late war for the use of submarines, and it may be stated that accurate and distinct communication was obtained in practice to and from submarines running submerged.

Most of the above experimental and practical work was done using wireless telegraph. Obviously, with the type of labor employed in mines and the necessity of the apparatus being such as to be operated by anyone in an emergency, the radio telephone will have to be used in mines, and not the radio telegraph which necessitates trained operators. The radio telephone is no different in principle of operation than the radio telegraph, so that from a theoretical point of view it is without doubt possible to communicate from the surface to the very bottom of 98 percent of the mines of the United States and to reverse the communication in about 80 percent of them.

Timber as Source of Danger

The timbering of a mine will always be a source of danger from fire. The use of carbide lamps will, of course, always add to the danger of fire. And yet, it seems peculiar that, practically speaking, electricity in the form of small storage batteries for light miners' lamps has not yet seemed to have been practical enough to be adopted by mining concerns. The mine shaft carries the hoisting paraphernalia and the skips, or containers, and men are constantly passing up and down the main shaft. Through the main shaft also must run telephone communication, signaling bells, compressed air tubes, and water pipes for pumping the water in the mines. If a fire or bad cave-in does occur in this shaft, whoever is below is almost instantaneously cut off from outside guidance. Radio offers a speedy relief to those who might be imprisoned as far as communication alone is concerned. Communication, however, is not the only problem. There is the problem of food. There is the problem of water. There is the problem of suffocation from gases. Radio will not help all of these. Food cannot be transmitted by radio. Water usually is present more or less. But the problem of foul air can be greatly helped by the use of directional instructions given from above.



Might Obtain Directions

In the mining office there is a map usually kept up to date, showing every small stope, man-way and bulkhead in the mine. Some of the miners who are imprisoned might remember the part of the mine with which they are familiar and in which they have been working. However, they will not remember all of the details of the entire mine, and it can easily be seen that by means of radio communication from above to below, the miners might be directed to a certain part of the mine where fresh air could be pumped down to them by another shaft which might be so choked up as to be unclimbable as an exit, but through which fresh air could be pumped. They could also be told of the progress of the rescuers. They could be relieved of the enormous and harmful mental tension which certainly would exist in the minds of the imprisoned men, and a great deal of good be done in that way—all of this, of course, presupposing only the miners could receive, but could not send back to the upper levels.

In a testimony given at the inquest following a recent mine disaster, I believe it was stated in the newspapers reporting the news that one man said that the skip might have been sent down again and brought up some of the imprisoned men before the guide timbers of the skip became burned off so as to block

progress of the skip. Testimony answering this statement was to the effect that the signaling lines had been burned off at the very first and it would have been impossible to control the progress of the skip had it gone down. Radio communication cannot become burned away, or destroyed in any manner.

This recent mine disaster has shown us that radio *can* profitably be used in the mining industry. The only question which remains open is what type of apparatus should be used and who will be the people who will pioneer the investigation work and find out exactly what type of apparatus is the most satisfactory for various purposes. While it may be argued that radio in the mine would not have saved the miners' lives, there is also a great deal to be said on the side that perhaps radio would have helped to save these miners, provided, of course, that radio had been previously developed to a point where the apparatus was practical in the mine.

The First Step

It is, of course, a long jump from writing an article of this sort and telling just where radio might be used to the actual adoption of practical apparatus in the mining industry; but the purpose of this article is merely to start the ball rolling and get different people in and out of the mining industry thinking along the lines of radio for mines so that somebody, some time, will take up the problem in earnest and solve it—for it can be solved. A receiving set to be used by the mines below would be quite simple, would not be heavy, and would present no difficulties to radio engineering. A sending set, however, to be fixed up so that the imprisoned miners could talk back to those above, presents a problem, it is true, but one which could easily be solved by close application. The apparatus would have to be highly portable. It would have to be more or less fool-proof in its tuning, because the mines certainly could not afford to send a radio operator down with each shift. Precaution will have to be taken, of course, that no sparks are released which might cause an explosion, however, dry cell units are now available which will last for a considerable length of time under heavy use. Sets, such as these, might be placed in certain intervals throughout the mine, to be used only in case of disaster, and should be kept up and in working use all the time.

As stated before, radio of this sort is entirely practical, but not yet fully developed. It would help a great deal in cases of entrapped men and, while it would not rescue them, it would most certainly aid rescuers and prisoners to a great extent. Radio alone will not do the work—but radio, in conjunction with proper food caches, oxygen helmets, and emergency supplies, would certainly greatly increase the chances of averting the great disaster.

Three Classifications Made

In reviewing the situation as a whole, and trying to see where radio would be useful to the mining industry, we find that it perhaps may be divided into three great heads. The first, of course, is safety, which we have already touched upon; the second is amusement; and the third perhaps might be called general communication. Mining communities in their very name are mining communities. They are more or less closely bound together by a common labor. A great many of these communities are placed far away from the centers of civilization. Radio will put them instantly in touch with what is going on in the world, exactly as it does every other isolated spot. After the evening's work is done, good music may be enjoyed, speakers may be heard who never would be heard perhaps by the miners in any other way. In other words, radio will do a great deal to civilize, educate and amuse isolated communities. This is no idle prediction, because it is already being done at the present time, even far off in the mountains, there is hardly a community nowadays which does not have at least one or two radio outfits, with eager listeners all the time. Then comes the problem of the solitary prospector. A crystal receiving set needs no batteries, does not weigh much and yet under good conditions at night can receive from 50 to 75 miles and perhaps even 100 miles. His lonely nights are lonely no longer. He may sit by his campfire and feel that he is not so far away from the center of things as he used to be. It is not good for man to become lonesome, and radio will keep him from ever feeling that he is alone in the world.

Overland Communication

The problem of communication overland may not be so important, and yet, in the mountainous parts of the country where mines are most frequent, it costs a great deal to install, repair and keep in shape, particularly during the winter months, an overland telephone line. In a great many cases, such lines will cost a great deal more than a radio installation necessary to do the same work, and there are a number of places throughout the country which are using radio communication between two points purely and simply from the standpoint of cost, where the upkeep of a physical line is enormous due to natural conditions.

We may say, in conclusion, that radio is here, and that it is only necessary for the prpoer use to be demonstrated in the mining industry, and it will be used in that industry. Let those who are most intimately acquainted with the problems of mining think and ask themselves where can this new science be profitably used in their business. Let them experiment, try out various kinds of apparatus, until a proper kind is developed and then let them put it into daily use. In other words, the purpose of this article is not to say to the miners and mine owners that they should today be using radio—because the writer obviously knows a great deal more about radio than he does about mining—it is simply to start the miners and mine owners thinking about radio to get them to ask themselves where they can use it, how they can use it, and then let them demand of the radio industry that it supply the proper apparatus to do the work that the mining industry desires. Then will the radio industry, because there will be a demand for that sort of apparatus, get busy and, I have no doubt, will be able to develop apparatus which will be perfectly satisfactory for whatever purpose the mining industry may desire.

DRILL STEEL REPORT TO BE DISCUSSED

CONCLUSIVE INFORMATION concerning the breakage and heat treatment of the rock drill steels and other steels and alloys subjected to similar impact stresses will be developed at a meeting of the Advisory Board which has been working with the Bureau of Mines and the Bureau of Standards on this subject, the discussion to be held in New York, February 19.

The discussion will center in the report submitted last October by experts of the Bureau of Mines who investigated the subject, particularly the recommendations as regards certain investigations being conducted and the purpose of these studies. The discussion is expected to bring out new angles on the subject, in addition to those which will naturally be considered in connection with the bureau's report, which was prepared by Messrs. Foley, Burnholz and Clayton. The call for the meeting of the board was issued by D. A. Lyon, chief metallurgist of the bureau.

COAL WAGE AGREEMENT

HAVING CLEARED up the bituminous wage agreement, the coal commission expects from now on to vigorously prosecute its investigation of fundamental factors involved in the general coal situation. Satisfaction is being expressed by members of the commision over the one-year wage agreement negotiated by bituminous operators in Ohio, Illinois and Indiana, although it is known that they would have favored a two-year agreement, having expressed the opinion that such a pact would have enabled Congress to enact constructive legislation affecting future wage agreements.

FEDERAL EXPERTS REVIEW MINING CONDITIONS

Geological Survey's Observers Review Developments Affecting 1922 Production of Gold, Silver, Copper, Lead and Zinc—General Improvement Shown—Increased Outputs are in Rule Throughout

RESPONDING TO FAVORABLE conditions created by industry's recovery from depression, metal mining operations in 1922 showed marked improvement as compared with the small and belabored progress made during the previous year. Few exceptions to this improvement are found in the summary made by the Geological Survey of production of the five leading metals in western states. Operations that had been carefully nursed along during the depression when demand was at a minimum and producing costs at highest levels leaped at the long-awaited arrival of better conditions.

Though, in some quarters, the revival came early in the year or actually was first seen in the last months of 1921, it did not become broad-spread until the middle of 1922 had been passed. Even then, some fields, hampered by handicaps of peculiarly local complexion, failed to respond, but these situations were so rare as to be marked exceptions to the general rule.

During the year labor conditions caused much anxiety for a period, but later became somewhat easier as men came into the mining industry from the farms and allied employments at the advent of cold weather. Costs of material showed no startling declines, but improved markets offset this condition in degree as well as that surrounding the failure of freight rates to respond appreciably to the general rehabilitation movement.

Summaries of mining conditions during the past year in the western states have been made by experts of the Geological Survey, and are presented here, with statistics presenting preliminary estimates of production during 1922 as compared with revised figures for 1921.

ARIZONA

	1921	1922
Gold	$2,930,303	$3,618,000
Silver (fine ounces)	2,469,394	4,760,000
Copper (pounds)	185,034,194	418,000,000
Lead (pounds)	6,541,433	14,080,000

Value of the gold, silver, copper, lead and zinc produced by mines in Arizona in 1922 was $65,219,000; the value in 1921 was $29,563,472, according to the estimate of V. C. Heikes, of the survey. A marked increase was made in the production of all metals as a result of the resumption of activities early in the year at the large mines and smelting plants. The total, however, was not unusually large and did not approach the average of the last ten years.

The gold produced increased from $2,930,303 in 1921 to $3,618,000 in 1922 as a result of the increase in gold from the smelting and refining of copper ore.

The mine output of silver increased from 2,469,394 ounces in 1921 to about 4,760,000 ounces in 1922. Most of the silver was produced from copper ore mined in Cochise and Yavapai counties.

The mine output of copper increased from 185,034,194 pounds in 1921 to 418,000,000 pounds in 1922. The value of the output increased from $23,869,411 in 1921 to $56,029,000 in 1922. By May all the large smelting plants except the one at Clifton were active, and most of the copper mines except the Magma had resumed operations. The largest producers of copper in 1922 were the Inspiration, Miami, and Copper Queen mines, followed by the United Verde, Calumet & Arizona, United Verde Extension, New Cornelia, Ray Consolidated, Old Dominion, Arizona Commercial, Iron Cap, Swansea and Superior & Boston.

The mine production of lead in Arizona increased from 6,541,433 pounds in 1921 to 14,080,000 pounds in 1922. The value of the output increased from $294,364 to $802,500. The Copper Queen mine, at Bisbee, the largest producer of lead in Arizona, greatly increased its shipments of silver-lead ore, which is smelted at El Paso, Tex.

The Copper Queen mine was the only producer of zinc in Arizona in 1922 and shipped several hundred tons of zinc ore to an eastern smelter. The Hillside mine, in Yavapai County, was idle, but work was resumed at the Tennessee mine, in Mohave County.

The dividends paid by Arizona mining companies (New Cornelia, Miami, United Verde Extension, Calumet & Arizona, United Eastern, United Verde and Arizona Copper) during the first eleven months of 1922 amounted to $6,630,815, exclusive of $1,800,000 paid by the Phelps Dodge Corporation, which operates the Copper Queen and Morenci properties in Arizona and other mines in Mexico and New Mexico.

COLORADO

	1921	1922
Gold	$6,835,328	$6,500,000
Silver (fine ounces)	5,631,657	6,000,000
Copper (pounds)	4,153,442	3,600,000
Lead (pounds)	19,660,466	22,000,000
Zinc (pounds)	2,360,000	24,000,000

Colorado mines in 1922 produced $6,500,000 in gold, 6,000,000 ounces of silver, 22,000,000 pounds of lead, 3,600,000 pounds of copper, and 24,000,000 pounds of zinc, as compared with $6,835,328 in gold, 5,631,657 ounces of silver, 19,660,466 pounds of lead, 4,153,442 pounds of copper, and 2,360,000 pounds of zinc in 1921, according to Charles W. Henderson of the survey. Average prices in 1922 were $1 for silver, $0.134 for copper, $0.057 for lead, $0.057 for zinc, as compared with $1 for silver, $0.129 for copper, $0.045 for lead, and $0.05 for zinc in 1921.

The situation in the Colorado metal-mining industry during the first half of 1922 was disappointing, but there was a marked improvement as the year drew to a close, particularly when the November prices for lead and zinc warranted hope for stability of market. There was also increased interest by capitalists in investigation of the industry.

The price of nearly $1 an ounce for silver from domestic ores under the Pittman act was all that kept many Colorado mines in operation in 1922, and the fact that the government's purchases of silver under this act will probably be completed within the next 12 months give cause for serious thought. The price of lead was low until November, and lead-silver ores depended on the silver content to carry the costs. Until November also there was hardly any available market for Colorado zinc ores, even at the low prices at which they were offered. Joplin concentrate was shipped into the state. Until some signs of encouragement were seen in the zinc market many operators did not feel like spending money in unwatering and clean-up mines after long idleness. Fortunately, the workings and mills of some of the zinc properties were kept in repair. Much of the zinc output for 1922, however, came from stocks accumulated from operations in 1920, or from zinc ores removed in 1921 and 1922 of necessity in the mining of contiguous silver ores.

Although there was very little activity around Silverton the San Juan region as a whole made the best record for the year. The Black Bear mine was kept in repair in preparation for the mining of the lead-zinc ore already blocked out. The ore from this mine will first be treated at the Coolbaugh process plant, for which ground was broken in August on the Durango smelter site, adjacent to

the lead furnaces. This process, developed in the Bulkeley Wells Denver laboratories, is to be used for the removal of zinc from the ores of the San Juan region as a preliminary to lead smelting at Durango, which has long been hampered by the excessive zinc content of the San Juan ores. It is hoped that the cost of removing the zinc can be met by the sale of the zinc product made.

Because of lack of capital, the discoveries in 1921 of silver at the Hope and Park Tunnel mines, near Aspen, Pitkin County, could not be explored extensively. A large quantity of pyritic silver-copper ore was shipped from Gilman, Eagle County, to Salt Lake smelters. Leadville looked for a renewal of operations in the spring and summer, but it did not come until fall. The dredges and hydraulic mines near Breckenridge produced $277,000 in gold in 1922, compared with $337,980 in 1921.

IDAHO

	1921	1922
Gold	$545,731	$490,000
Silver (fine ounces)	6,080,528	5,998,000
Copper (pounds)	1,688,195	3,946,000
Lead (pounds)	198,469,119	195,300,000
Zinc (pounds)		4,400,000

Gold, silver, copper, lead and zinc was produced from mines in Idaho in 1922 to the value of $18,399,000, according to an estimate by C. N. Gerry, of the Survey. In 1921 it was $15,776,819. The production of zinc and copper increased, gold decreased, and silver and lead were nearly the same as in 1921. The increase in total value was due largely to the increase in the price of lead. In general mining conditions improved in 1922. The labor situation was better, metal prices were increasing, and freight rates were reduced. Production was retarded, however, by the idleness of the Hercules and Tamarack & Custer mines for about seven months.

The mine output of gold in Idaho in 1922 was valued at $490,000, as compared with $545,731 in 1921. As in other recent years, a large part of the gold output in 1922 came from the Gold Hill & Iowa mine, at Quartzburg, and the dredge of the Yukon Gold Co., at Murray, but the output from both these properties decreased.

The silver output decreased slightly, from 6,080,528 ounces in 1921 to 5,998,000 ounces in 1922. The largest silver producers in the state were the Bunker Hill & Sullivan, at Kellogg, the Hecla mine, at Burke, and the Morning mine of the Federal Mining & Smelting Co.

The mine output of copper increased from 1,688,195 pounds in 1921 to 3,946,000 pounds in 1922. The value of the output increased from $217,777 to $529.000.

The mine output of lead decreased from 198,469,119 pounds in 1921 to 195,300,000 pounds in 1922, but the average price of lead was about 5.7 cents a pound, and the value increased from $8,931,110 to $11,132,100. The Bunker Hill mine produced much more lead than any other in the state.

The mine output of recoverable zinc increased to 4,400,000 pounds, valued at $250,800, as a result of the higher price of zinc and reduced freight rates. The Callahan Zinc-Lead Co. and the Morning mine of the Federal Co. resumed shipments of zinc concentrate in November. Concentrate on hand at the Success mine was not shipped in 1922.

Dividends amounting to $2,019,250 were paid by the Bunker Hill, Hecla, and Star Mining Companies during eleven months of 1922. The Star mine was not producing, but the dividend was distributed after the settlement of the suit with the Federal Co.

MONTANA

	1921	1922
Gold	$1,480,763	$1,664,000
Silver (fine ounces)	6,558,713	12,500,000
Copper (pounds)	48,098,730	165,100,000
Lead (pounds)	20,366,917	29,775,000
Zinc (pounds)	23,275,966	114,000,000

Montana's production of gold, silver, copper, lead and zinc mined in Montana in 1922, was $44,483,000, a large increase from the value of $16,324,521 in 1921, according to an estimate by C. N. Gerry, of the Geological Survey. The output of silver, lead and zinc was close to normal, but that of gold and copper was below the average of the last 20 years. The large mines at Butte resumed operations early in the year, but the copper mines were not operated at maximum capacity. Wages at Butte were increased, and by December the market for metals had improved considerably.

The value of the output of gold increased from $1,480,763 in 1921 to $1,664,000 in 1922. The production of gold from copper ores increased considerably but did not approach past records. The output from placers and gold ores is gradually decreasing.

The mine output of silver increased from 6,558,713 ounces in 1921 to 12,500,000 ounces in 1922. The resumption of activity at Butte, together with the general incentive to mining due to the price of silver, resulted in an output close to that of 1919 and 1920. Most of the silver came from the copper mines of the Anaconda Copper Mining Co., at Butte, and a large part from the zinc and silver mines at Butte.

The output of copper increased from 48,098,730 pounds in 1921 to 165,100,000 pounds in 1922 as a result of a better market for copper. The copper smelting plant at Anaconda resumed operations in February and was producing later at the rate of 14,000,000 pounds a month.

The mine production of lead increased from 20,366,917 pounds in 1921 to 29,775,000 pounds in 1922, and the value increased from $916,511 to $1,697,175. Most of the lead was produced from zinc ore or silver-lead ore of the Butte & Superior, Elm Orlu, Davis Daly, Moulton, and Anaconda properties at Butte. Much of this lead was recovered by smelting residues from the electrolytic zinc plant near Great Falls.

The output of recoverable zinc in Montana increased from 23,275,966 pounds in 1921 to 114,000,000 pounds in 1922. The value increased from $1,163,798, to $6,498,000. The Butte & Superior mine was again active and was the largest producer of zinc in the state.

No dividends were paid by mining companies operating in Montana during the first eleven months of 1922.

NEVADA

	1921	1922
Gold	$3,312,757	$3,147,000
Silver (fine ounces)	7,083,782	8,198,000
Copper (pounds)	10,961,491	19,892,000
Lead (pounds)	7,188,768	9,107,000
Zinc (pounds)	69,397	3,200,000

Gold, silver, copper, lead and zinc mined in Nevada increased in value from $12,137,536 in 1921 to $14,712,000 in 1922, according to preliminary figures compiled by V. C. Heikes, of the Geological Survey. This was greater than the value in 1921 but much less than that in any other recent year.

The output of gold decreased from $3,312,757 in 1921 to $3,147,000 in 1922. The gold from the Tonopah district increased from $999,094 to $1,199,690, and that of the Goldfield district from $146,782 to $242,300.

The mine production of silver increased from 7,083,782 ounces in 1921 to 8,198,000 ounces in 1922, as the mining companies made every effort to take advantage of the Pittman act. The Tonopah district produced 5,665,000 ounces, as against 4,623,901 ounces in 1921, and the development of several of the mines at depth was most encouraging.

The mine output of copper increased from 10,961,491 pounds in 1921 to 19,892,000 pounds in 1922, and the value from $1,414,032 to $2,666,000.

The mine output of lead increased from 7,188,768 pounds in 1921 to 9,107,000 pounds in 1922, and the value from $323,495 to about $519,000.

The mine output of recoverable zinc increased from 69,397 pounds in 1921 to 3,200,000 pounds in 1922. Much of the ore shipped to zinc plants in December did not reach its destination in 1922. The Yellow Pine mine, after two years

of idleness, resumed shipments in November.

The published dividends paid by Nevada mining companies in eleven months of 1922 amounted to $767,237. The principal contributors were the Tonopah Extension, Tonopah Belmont, Tonopah Mining, West End and Rochester Silver Companies.

NEW MEXICO

	1921	1922
Gold	$196,822	$374,000
Silver (fine ounces)	571,899	700,000
Copper (pounds)	14,267,338	31,000,000
Lead (pounds)	678,601	2,600,000
Zinc (pounds)	228,000	4,500,000

Metal mines in New Mexico in 1922 produced $374,000 in gold, 700,000 ounces of silver, 2,600,000 pounds of lead, 31,000,000 pounds of copper, and 4,500,000 pounds of zinc, as compared with $196,822 in gold, 571,899 ounces of silver, 14,267,338 pounds of copper, 678,601 pounds of lead and 228,000 pounds of zinc in 1921, according to Chas. W. Henderson, of the Survey.

The metal output of New Mexico depends directly and indirectly on the price of copper. In 1921 the Chino Copper co., which has large developed reserves of coppe. ore at Santa Rita, closed its large milling plant at Hurley on April 12. This mill was reopened on April 1, 1922, and it continued throughout the remainder of the year at about 30 percent. capacity, producing 26,660,000 pounds of copper in concentrate. As soon as the copper concentrate began to arrive at the El Paso smelter a market was set up for the siliceous ores of Lake Valley, which incidentally carry silver.

With the reopening of the Colorado Fuel & Iron Co.'s steel mill at Pueblo, Colo., in April, 1922, iron-manganese ore from Silver City and iron ore from Fierro began to move in large quantities to Pueblo.

Lessees at the Aztec mines, at Baldy, continued throughout the year to ship gold bars to the Denver Mint as a result of the milling of stope filling. Some development work was also done at the mine in the hope of discovering new ore bodies similar to those of 1868 and 1915-1920.

WASHINGTON

	1921	1922
Gold	$128,486	$181,700
Silver (fine ounces)	142,450	192,000
Copper (pounds)	251,544	335,000
Lead (pounds)	143,553	1,500,000

The five-metal production in Washington was $573,000, as compared with $332,313 in 1921, according to an estimate of C. N. Gerry, of the survey. The improvement of the metal market, especially during the last part of the year, resulted in an increase in all five metals, but the total value was much less than the average of the last ten years.

The mine production of gold increased from $128,486 in 1921 to $181,700 in 1922. Gold from the Republic district increased only slightly, to $91,700, but the production from the Boundary Red Mountain mine, in Whatcom County, increased materially.

The mine output of silver increased from 142,450 ounces in 1921 to 192,000 ounces in 1922. A large part of the silver was recovered in smelting silver-copper ore from Chewelah.

The mine output of copper increased from 251,544 pounds in 1921 to 335,000 pounds in 1922. Copper-silver ore and concentrate were shipped from the United Silver Copper mine, at Chewelah, at the rate of 150 tons a month, but the mill did not resume operations until late in the year.

The mine output of lead increased from 143,553 pounds in 1921 to 1,500,000 pounds, valued at $85,500, in 1922. As the lead smelting plant at Northport was dismantled in September, lead ore was shipped to Bradley, Idaho, and East Helena, Mont.

As the market for zinc improved, a large quantity of first-class zinc ore was shipped from the Washington Black Rock mine, near Northport, to the electrolytic zinc plant at Trail, British Columbia.

ALASKA

More than eighteen million dollars worth of minerals was taken from Alaska mines in 1922, which brings the output back to figures of almost the pre-war magnitude. According to estimates made by Alfred H. Brooks, chief Alaskan geologist of the survey, the value of the mineral output of Alaska in 1922 was—gold, $7,720,000; copper, $9,000,000; silver, $730,000; and coal, $450,000; the total value, including that of lead, platinum, petroleum, marble, and gypsum, was $18,250,000, compared with $17,000,000, the value of the output in 1921.

The total output of lode gold in Alaska in 1922 had a value of about $3,600,000. The most encouraging fact about the Alaska lode-mining industry is that the loss of output from the closing of some large Juneau gold mines has already been made up in part by the output of smaller mines in other districts. These facts are cited because many believe that the closing of some of the Juneau mines means the end of any considerable quartz mining in Alaska, but in 1922 development and prospecting of hard rock gold deposits were active in every Alaska lode district accessible from railroad or tidewater.

Most of the copper mined in 1922 was obtained from the three large mines of the Kennecott group, in the Chitina Valley, and from the Beatson-Bonanza mine, on Prince William Sound. The low price of copper has prevented as yet the reopening of small mines.

For many years the Alaska metal mining industry was handicapped by being forced to pay heavily for its fuel, because the use of local coal was not permitted. The coal mining done during the year has supplied the most urgent need for cheaper fuel along the Alaska Railroad and has shown the great value of the coal for local use. The question when Alaska high-grade coal can be mined for export has not yet been settled.

UTAH

	1921	1922
Gold	$1,769,905	$2,201,500
Silver (fine ounces)	12,251,998	16,800,000
Copper (pounds)	30,891,403	95,500,000
Lead (pounds)	89,187,269	134,000,000
Zinc (pounds)	.....	5,290,000

Utah's production of gold, silver, copper, lead and zinc in 1922 was $39,738,-

000, according to an estimate by V. C. Heikes, of the survey. In 1921 it was $22,023,790. The production of all metals increased decidedly, though the value was not great compared with the average of the last ten years. The outstanding features of the year were the abnormal increase in the production of silver, which makes a record for the state, and the resumption of copper mining on a large scale at Bingham.

The mine production of gold increased from $1,769,905 in 1921 to $2,201,500 in 1922. The gold produced from copper ore was greatly increased, as the Utah Copper and Utah Consolidated properties were again active.

The mine output of silver increased from 12,251,998 ounces in 1921 to 16,800,000 ounces in 1922. This marked increase of more than 4,500,000 ounces was generally distributed, but the gain was especially noticeable in the Park City and Tintic districts.

The mine production of copper increased from 30,891,403 pounds in 1921 to 95,500,000 pounds in 1922, and the value from $3,984,991 to $12,797,000. The Utah Copper Co., the largest producer in the state, resumed operations in April and was producing more than 10,000,000 pounds of copper a month in the third quarter, or about half the maximum capacity.

The mine output of lead increased from 89,187,269 pounds in 1921 to 134,000,000 pounds in 1922, and the value increased from $4,013,427 to $7,638,000. The average price of lead was about 5.7 cents a pound.

The mine output of recoverable zinc in 1922 was 5,290,000 pounds. Most of the zinc was produced from lead-zinc ore mined at the United States mine, at Bingham, and milled at Midvale. Much zinc concentrate that had been stored while the price of zinc was low was shipped in 1922.

In 1922 the mines in Utah produced about 5,500,000 tons of ore, an increase from 2,137,522 tons in 1921. Of this total the Bingham district produced 4,773,800 tons, as compared with 1,538,309 tons in 1921.

The dividends paid by mining companies in Utah in 1922 will amount to $4,166,393. Dividends amounting to $1,702,224 were also paid by the United States Smelting, Refining & Mining Co., which controls mines at Eureka and Bingham as well as mines in other states. The following companies contributed: Utah Copper, Chief Consolidated, Silver King Coalition, Eagle & Blue Bell, Tintic Standard, Park Utah, Iron Blossom and Columbus Rexall.

CALIFORNIA

	1921	1922
Gold	$15,704,822	$14,845,000
Silver (fine ounces)	3,629,223	3,181,200
Copper (pounds)	11,743,404	22,660,500
Lead (pounds)	1,124,276	6,260,800
Zinc (pounds)	1,057,731	3,615,000

California's output of gold, silver, copper, lead and zinc in 1922 was valued at $21,625,600, an increase of $673,177 over that in 1921, according to preliminary estimates by Charles G. Yale, of the survey. The yield of gold, however ($14,845,000), was $859,822 less, and that of silver (3,181,200 ounces), was 448,023 ounces less than in 1921. The production of copper was 22,660,500 pounds, valued at $3,036,500, an increase of 10,917,096 pounds and $1,521,601; that of lead was 6,260,800 pounds, valued at $356,800, an increase of 5,136,524 pounds and $306,208; and that of zinc was 3,615,900 pounds, valued at $206,100, an increase of 2,558,169 pounds and $153,213.

The loss in gold for the year was almost entirely due to a diminution in the output of the deep or quartz mines. The disastrous fire in the Argonaut mine stopped the regular output from two of the largest producers on the Mother lode and several other producers of note worked with reduced forces and mill equipment. Complaint was made of the scarcity of first-class miners, who seem to have gone into occupations that are more profitable and less hazardous than underground mining. The unwatering and reopening of several old mines on the Mother Lode, however, is encouraging. There has been little change in the placer-mining conditions of the state. The placers continue to produce 52 percent of the gold, as compared with 48 percent from the deep mines. Dredges are producing 95 percent of the placer gold and 49 percent of the total gold.

OREGON

	1921	1922
Gold	$882,034	$501,870
Silver (fine ounces)	41,830	173,000
Copper (pounds)	174,300	1,089,000

Production of metals in Oregon in 1922 shows a decrease of $252,000, as compared with 1921. The loss was entirely in gold, according to a preliminary estimate by Charles G. Yale, of the survey, both silver and copper showing increases. The value of the gold produced decreased from $882,034 in 1921 to $501,870 in 1922. In recent years the usual ratio of gold production has been about 54 percent from placers and 46 percent from deep or quartz mines, and the deep mines have been decreasing their gold output while the placers have been increasing theirs. There are more hydraulic mines in Oregon than of any other class, but most of them are small. In recent years the gold dredges have contributed 80 per cent of the placer gold and 43 percent of the total gold annually produced in the state. Direct returns from the four companies operating dredges in 1922 show a combined decrease in gold yield for 1922 as compared with 1921, of 30 percent due mainly to scarcity of water for electric power, which permitted only three-fourths of a full year's work. Several of the large deep mines were entirely idle, and others showed reduced production for the year.

The silver output of Oregon for 1922 is estimated at 173,000 ounces. The estimated output of copper in 1922 is 1,089,000 pounds, valued at $145,000, an increase of 914,700 pounds and $123,000. This increase is due almost entirely to the resumption of production by the largest copper mine in the state, which was idle in 1921.

There are now less than 100 productive metal mines in Oregon and no new ones of special importance began operations in 1922. Metal mining is recovering very slowly from war-time conditions, and apparently little effort is being made to produce capital to aid this recovery or to increase public interest in the industry.

SOUTH DAKOTA

	1921	1922
Gold	$6,605,167	$6,636,000
Silver (fine ounces)	112,464	120,200

South Dakota had in 1922 an output of $6,636,000 in gold and 120,200 ounces of silver, compared with $6,605,167 in gold and 112,464 ounces of silver in 1921, according to Charles W. Henderson, of the survey, whose figures are based on eleven months' actual output plus an estimate for December from the Homestake and Trojan companies, in the Black Hills district. The Homestake mine paid a dividend of 25 cents a share monthly for the first ten months and increased it to 50 cents a share in November, making a total for the twelve months of $879,060. The Homestake mine and mills, at Lead and Deadwood, were operated steadily.

TEXAS

Texas mines produced 600,000 ounces of silver in 1922, according to Charles W. Henderson, of the survey. The Presidio mine, at Shafter, which has been in steady operation since 1885, continued to contribute the bulk of the output. Several small lots of silver ore were shipped from prospects in the northwestern counties bordering the Rio Grande.

Senator James E. Watson

Woofing and Warping

XV.

Senator James E. Watson

A Series of Scrutinies Directed Toward Notable Legislative Personalities

By IRA L. SMITH

OUT IN INDIANA state, where politics is an epidemic, flocks of Hoosiers got out their one-hoss shays some twenty-eight years ago to journey to the polls that they might ply ballot boxes with their expressed desires that James E. Watson, lawyer, be transplanted to Washington. By so doing, they shipped to the nation's capital the material out of which has been shaped a Sir Oracle for the Senate.

Rambling through term after term of service in the House, their choice gathered unto himself all the ear-marks of an indispensibility, and it was decreed some years ago on the banks of the Wabash far away that he be one of those few mothers' sons of us that get to be senators.

During his thirty years beneath the Capitol's dome, he has annexed large portions of experience and skill as a solon. So like a walking guide on things legislative and parliamentary has he become, that his fellows are with him almost as constantly as his shadow, seeking his word on this, that and several other things. "Let's see Jim!" is the phrase that pitter-patters its way up and down the senate cloak rooms and corridors whenever a problem of heft puts in its appearance and demands solution.

James Watson is a speaker who knows how to keep his mouth shut. That, next to his abundant knowledge of things capitolian, is the thing that puts him in a niche somewhat distinct from that occupied by senators who air such oratorical abilities as they possess. Although Jim, as he is called by all who know him, hardly turned a finger in batting sixty speeches over the country-side during the recent political campaign, his voice and the walls of the senate chamber are hardly more than fair acquaintances. The wealths of his oratory have been ladled out by his gifted tongue into the air of each state of the union, but he attends so closely to his knitting as a member of the finance and interstate commerce committees that Washington's welkin almost goes begging on this score.

He stands in the position of a Republican leader, having been boosted up to this place by his experience as a legislator, skill as a parliamentarian, study of national politics, incessant industry, knowledge of the tariff, and general friendliness.

He is a close confidante of President Harding, with whom he shares November 2 as a birthday, though his 58 years have brought the date around to him one time more than to the chief of the land. It was on their mutual birthday that both received record votes in 1920.

Shaking hands is his recreation. For him, meeting people takes the place of golf, motoring, fishing, hunting. He mingles with humans, not as a politician, but as a man whose appreciation and interest in his fellows has brought Jim almost as many friends as a mosquito has enemies. A Hoosier almost has to be a hermit to prevent him from knowing him by his first name. Small wonder that the senator, packing around with him a remarkable memory for faces and names, journeys out Indiana way whenever he can get out of the legislative whirl.

Next to greeting friends, the senator enjoys watching a ball game, this being a bequest from the days when he tossed the pill around as a student at DePauw University.

Although he probably is not sufficiently versed in technology to figure near which corner of a cow he would sit in performing a milking, he does know what will prove of benefit to the owner of the animal, his advice and counsel having much to do with shaping the administration's program for agricultural relief legislation. And, though he may never have taken a trip toward China along the route of the shaft of a metal mine, he and his tariff-making ability drove many nails in the joining of metal schedules to the recently-enacted tariff measure.

His position on fundamentals is as solid as that of the pyramids on the phiz of Egypt. Though he may compromise for policy's sake, he would no sooner stage a barter of principle than a Wyoming cow-puncher would swap his sombrero for a brown derby. He is a 100 per cent plus Republican, and never sits down in the presence of his party. This steadfastness in the faith, coupled with his abilities as a conciliator, make him a real valuable of the G. O. P.

In a word, he is a good listener and good speaker bedecked with friendliness as a man, endless energy as a worker and general willingness to aid—a combination that any feet in the world would be proud to carry to a deserved success.

INTERNAL REVENUE BUREAU SEES CHANGES

Shift in Executive Personnel Follows Resignation of Deputy Commissioner Batson—Agency Bends Efforts to Dispose of 1917 Tax Returns

CHANGES CONTINUE to be made in the personnel of the Bureau of Internal Revenue. During January E. H. Batson, deputy commissioner, who resigned to resume the practice of law, was succeeded by E. W. Chatterton, assistant deputy commissioner, who in turn was succeeded by J. G. Bright, formerly assistant chief of the consolidated returns subdivision of the income tax unit. D. M. McPherson, of the audit section, and H. A. Tufel and E. B. Evans, of the review section, natural resources division, also have resigned to engage in the practice of accounting and federal income tax practice. C. E. MacCloskey has been made chief, and E. E. Hensinger assistant chief of audit "F" section, succeeding W. R. King and D. M. McPherson, former incumbents.

A Race With The Law

The natural resources division is bending every effort to dispose of 1917 tax returns prior to the expiration of the statute of limitations on March 1. Owing to the fact that additional taxes must be assessed or waivers secured before that date in order to protect the government's claims, many assessments are being made without giving taxpayers the usual 30-day notice by registered mail. It has been announced that the audit of 1917 tax returns, upon which waivers have not been filed, will be followed by assessment of additional taxes found to be due on the basis of evidence on file. Where the additional taxes are assessed without giving taxpayer preliminary notice of 30 days, bona fide claims for abatement, filed within ten days after notice and demand by the collector, may be entertained. Where the 30-day notice has been given and taxpayers wish to appeal, waivers for the year 1917 will be required as a condition precedent to an appeal.

An Important Decision

The Treasury Department has announced a decision of the district court for the southern district of New York holding that dividends paid by a corporation in 1917 (except as to distributions made prior to August 6 from profits accrued prior to March 1, 1913), are conclusively presumed, for the purpose of determining the rates at which taxable to stockholders, to have been paid from the most recently accumulated profits, including profits for 1917, regardless of resolutions by the board of directors specifying that such distributions are to be paid from depletion reserve. The court held further that in construing section 31 (b) of the revenue act of 1916, as amended, distributions from depletion reserve without reduction of capital stock are not to be differentiated from ordinary dividends; and that calling the distribution of corporate assets a distribution of depletion reserve does not make it a payment of capital instead of income when there are net earnings or accumulated surplus sufficient to meet it.

The department has been called upon by the Senate to furnish the names of companies upon which penalties have been imposed by the Bureau of Internal Revenue under section 220 of the 1921 revenue law for evasion of taxes. The resolution was introduced by Senator Brookhart, Iowa, who gave a list of 328 corporations reported by the Federal Trade Commission to have distributed surpluses during 1922, aggregating more than $2,149,151,425, by means of stock dividends. It is predicted in official circles that this action will result in court proceedings to test the constitutionality of section 220.

Notwithstanding the propaganda which has been broadcasted concerning alleged tax evasions, the department has devoted its attention to the disposition of the mass of tax returns and claims accumulated from prior years in order to make its work current as soon as possible; and the question of whether or not there have been tax evasions in violation of the 1921 law has been left to be decided when the 1921 returns are reached for audit in due course. This, it seems, was the logical policy to pursue if confusion and further congestion was to be avoided, as it is impossible to determine the accumulated surpluses of all corporations until their tax liabilities for prior years are definitely settled.

ACCIDENT STATISTICS ISSUED BY BUREAU

REPORTS RECEIVED by the Bureau of Mines from state mine inspectors indicate that approximately 1,950 fatal accidents occurred at coal mines in the United States in the year 1922. This tentative figure is based on actual reports covering eleven months and an estimate for December based upon the probable production of coal in that month. The estimate represents a reduction of 23 fatalities from the number killed at coal mines in 1921. The reduction in the number of fatal accidents will not, however, represent a lowering of the fatality rate. In relation to the quantity of coal produced the accident rate will be higher than that for 1921.

In a summarization of the year's accident record, George S. Rice, chief mining engineer, and W. W. Adams, statistician, of the Bureau of Mines, point out that the five-month period of the strike showed an abnormally low number of fatal accidents, and this reduction will of course be reflected in the total number of fatalities for the full year. The reduction in loss of life will not be as large as it otherwise might have been because of the large number of lives lost during the past year by coal mine explosions.

The outstanding feature of the past year, so far as mine accidents are concerned, is the large loss of life due to what the Bureau of Mines calls "major" disasters, that is, accidents in each of which at least five lives were lost.

Less than 10 percent of all mine fatalities are caused by explosions of gas and dust; nearly 50 percent result from falls of rock and coal.

By far the largest field for reducing the death rate in coal mines, say officials, lies in the prevention of deaths from falls of rock and coal. It is always found at the end of each year that if falls of roof and coal could have been eliminated nearly half of the lives lost in mine accidents could have been saved. During the past eleven months falls of rock and coal have resulted in the death of 787 men. This indicates a death rate of 1.930 per million tons, as compared with 2.012 for 1921.

The bureau's officials stress the need of a continuous campaign of education among the miners and a rigid enforcement of safety measures by mining companies and their foremen.

A gratifying reduction is shown in accidents caused in 1922 by powder and other explosives, the rate having declined from 0.300 to 0.211 per million tons. This class of accidents usually results in about 6 percent of all fatal accidents in the mines. Haulage accidents normally cause about 17 percent of the fatalities and the rate from this group during the past year was 0.711 per million tons, as against 0.667 in 1921. Electricity causes only from 3 to 4 per cent of the fatalities at the mines, the actual number of deaths varying from 75 to 90 each year. The rate for this group was 0.158 a year ago, while for 1922 it was 0.169. The rate for all classes of accidents in 1922 is estimated at 4.277 per million tons, as compared with 3.896 in 1921.

EQUIPMENT DISCUSSIONS TO FEATURE SESSIONS

Practical Discussion by Operating Men will be held daily at Exposition Exhibitors will be invited to send their most experienced engineers to discuss and demonstrate equipment at group meeting

By N. S. GREENSFELDER
Chairman, Manufacturer's Division, American Mining Congress

SPLENDID EXHIBITS of the latest developments in mining machinery and equipment and good attendances of mining men from many districts feature the annual conventions of the American Mining Congress, yet, in my opinion, these expositions, both from the standpoint of the manufacturer and the mining man, have yielded only a fraction of the results that are possible of accomplishment, considering the time and money expended.

Thoughtful consideration has been given to this matter by the officers of the Manufacturer's Division of the American Mining Congress and a program has been decided upon which will make the exposition to be held in Milwaukee next September far more interesting, instructive, and practical than any similar event in the past.

The program is briefly this: Questions for discussion will be submitted both by operating men and manufacturers. These questions will be grouped according to the class of equipment to which they refer, such as, explosives, drills, electrical equipment, mine transportation, etc. The discussions will take place in a room on the exposition floor, and both during and after each discussion, there will be an opportunity for actual demonstration of the equipment on exhibition.

All manufacturers who exhibit at the convention will be invited to send their most experienced men to take part in these discussions and to explain and demonstrate their products. All mining companies will be invited to send to the convention as many men as possible to talk over their problems and to learn about the latest developments in mine equipment. There will be exhibited types of practically every article used in mining. To obtain the same information that can be secured at this exposition in any other way, would cost many times as much as the trip to this convention, and would take more time than any man could afford to give.

The Milwaukee auditorium is indeed well suited for holding a great exposition. Definite arrangements have been made for a room on the exposition floor, in which brass-tack discussions of operating problems will be held each day. A program will be printed, containing a list of these questions and the time at which each will be discussed. These programs will be sent to every mining company in the country, as far in advance of the convention as possible. Able and experienced men will be sent by the manufacturers to lead the discussions which will be published following the convention and made available to all who are interested.

Milwaukee is a great machinery manufacturing center and has provided a capable and enthusiastic committee to handle the local arrangements. The Manufacturer's Division of the American Mining Congress, which is composed of the leading manufacturers of mine equipment in the country, has started active work on plans for the exposition, and the program to which I have referred. A special feature of the Milwaukee Convention will be the entertainment provided for the visiting ladies.

In fact, as I write this, just after a visit to Milwaukee, where I was accompanied by officers of the American Mining Congress and fellow members of the Board of Directors of the Manufacturer's Division, I am of the opinion that Milwaukee will make the Mining Congress famous.

WASTE FUEL STUDY MADE BY BUREAU

IN VIEW of the decreasing supply and the increasing cost of high grade fuels, the efficient utilization of fuels of low grade, including what are known as "waste fuels," is becoming a problem of major importance to many industries and to the commercial progress of the nation, states the Bureau of Mines. Important sources of "waste fuel" enumerated by David Moffat Myers, consulting engineer of the bureau, includes sawdust, shavings, scraps, edgings, tanbark, wood-extract chips, paper-mill refuse, bagasse or spent sugar cane, and city refuse.

Perhaps the most important waste fuel in the United States has been spent tanbark, according to Mr. Myers. A rough estimate would indicate that this material generated a few years ago an amount of steam that would have otherwise required the yearly consumption of about 2,000,000 tons of high-grade coal. Yet at one time this valuable fuel was considered a mere detriment and an expense to the leather industry.

Sawdust and wood waste are of course available mainly in lumbering districts. With sawdust the sawmills produce waste wood in the form of edgings, end cuts, shavings and various forms of blocks and scraps.

The results of a special study of the economic combustion of waste fuels are contained in Technical Paper 279, which may be obtained from the Bureau of Mines, Washington, D. C.

RÉSUMÉ OF OIL SHALE DEVELOPMENTS DURING 1922

By Dr. Victor C. Alderson

THE OUTSTANDING event of the year was the National Oil Shale Conference at Cleveland in connection with the annual meeting of the American Mining Congress. The leading feature of the conference, aside from the general discussion and the reports of committees, was the paper on oil shale mining by William C. Russell of Denver—the most comprehensive discussion of the subject that has yet appeared. The proceedings of the conference have been published as Supplement B of the October, 1922, issue of the Colorado School of Mines Quarterly.

Report on Metal

Too much attention cannot be given, by those who hold oil shale land by possessory title only, to the subject of securing title in fee simple by patent from the government. Robert D. Hawley, an attorney of Denver, has given close attention to this subject and has outlined governing principles.

Dean E. Winchester has carefully considered the factors which affect the value of oil shale land.

The main oil shale deposit of Indiana is a continuation of the Kentucky deposit which crosses the Ohio River at New Albany and extends north for a distance of about 50 miles, east and west from five to ten miles, and covers an area of 500 square miles. Although the yield of oil is low, yet other factors like homogeneity and thickness of strata, quantity available, accessibility, ease and cheapness of quarrying, and high nitrogen content may make these deposits eventually attractive from a commercial point of view.

An experimental retort, treating Sunbury shale, near Omega in Pike County, Ohio, yielded from 20 to 25 gallons to the ton. Another retort is now being erected at Buena Vista.

Much attention has been drawn to the oil shale deposits of Kentucky chiefly because of the vigor with which Prof. C. S. Crouse, of the University of Kentucky, has undertaken field work and laboratory investigations. In the laboratory of the university a new retort is in operation and under development which bids fair to be successful. The researches of Dr. Bernardt Thiesen on the Kentucky shale seem to indicate that the approximate oil yield may be determined by a microscopic examination. If so, it will be valuable as supplementary to chemical determination.

The National Retorting and Refining Corporation of Buffalo is contemplating the erection of their Newberry retort in this field. The Central Oil Shale Company of Pittsburgh is also contemplating the development of its property The full extent of the Kentucky shales can be realized only by the fact that they can yield four times as much oil as now remain in all oil pools of the United States.

The Day Engineering Company has designed a vertical retort, which may be properly described as a modified Scotch retort, with increased capacity and greater efficiency. A plant at Santa Maria, California, is projected to have a daily capacity of 400 tons.

The Geological Department of the Southern Pacific Company is now engaged upon a field survey of the entire land holdings of the company in order to determine the extent and character of its oil shale resources. The company is acting with great foresight because it must have a second line of oil resource when the well oil production of California has passed the peak. The field work of the geological department will cover rough field tests, supplemented by check work at the experimental plant of the Colorado School of Mines.

Operations in Montana

The oil shale deposits formerly owned by the National Oil Company of Dillon, Mont., have been acquired by the Chicago-Dillon Oil Shale Company with headquarters at Butte. Development work is planned together with the erection of a retort of the type erected at Fort Wayne, Ind., by the Koppers Company of Pittsburg.

After six years of experimental work on a commercial sized plant R. M. Catlin has placed his plant at Elko on a basis of regular commercial production. The work at the Elko plant is epoch making in that it records the first oil shale plant of commercial size to be operated in the United States. Other oil shale deposits are known to exist in Nevada but they have not been exploited. A plan is now being developed to make a survey of the entire state and to test the oil shale deposits for their oil content.

Utah Investigations

Utah is noted more for the laboratory investigations made at the United States Bureau of Mines station at Salt Lake than for development of oil shale deposits in the field, although the state has rich and extensive deposits. The most striking publication from the station is that by Superintendent Thomas Varley in which he, after careful investigation, puts a quietus upon the extravagant claims of individuals who have reported precious metals in commercial quantity in oil shale, recoverable by a secret process known only to themselves.

Oil shale activities in Colorado include erection of two commercial sized retorts at DeBeque. The Monarch Shale Oil Company has erected a Ginet retort of a minimum daily capacity of 50 tons. The Washington Shale Oil and Products Company of Seattle, Wash., is erecting a Ginet retort to have a daily capacity of 200 tons. The Index Oil Shale Company has erected a Brown retort.

(A Review by Dr. Alderson of foreign shale developments will appear in the March issue.)

SHALE BIBLIOGRAPHY

Alderson, Victor C.—Oil Shale and its Problems, Mining Congress Journal, December, 1922, p. 1088. Oil Shale Bibliography, Mining Congress Journal, December, 1922, p. 1088.

Bailey, Edwin M.—The Shade Oil Industry in Scotland, Journal of the Inst. of Petroleum Technologists, London, October, 1922, pp. 465-490.

Botkin, C. W., and Boyd, R. W.—On Shale Oil Unsaturates, Petroleum Age, December 1, 1922, pp. 78-85.

Burnham, Roderick D.—Why not Mining Men as Well as Oil Men? Colorado School of Mines Quarterly, October, 1922, Supplement B, pp. 49-51.

Crouse, C. S.—Some Economic Aspects of the Kentucky Oil Shales, Combustion, December, 1922, pp. 337-343.

Hayden, B. A.—Misleading Figures on Shale, Mountain States Mineral Age, November, 1922, pp. 22-23.

Kewley, James.—The Petroleum and Allied Industries, Dr. Van Nostrand & Co., N. Y., p. 302. Part IV. Crude oils produced by the distillation of shales, coals, lignites, and the like. Section A, Characters and distribution of Oil Shales, pp. 97-105. Section B, Mining of Shales, pp. 106-107. Section C, Laboratory Examination of Shales, pp. 108-110. Section D, Retorting of Oil Shales, pp. 111-119. Section E, Character of Shale Oils, pp. 120-124.

National Oil Shale Conference, Cleveland, Ohio, October 10 and 11, 1922. Proceedings and Reports of Committees, Colorado School of Mines Quarterly, October, 1922, Supplement B, pp. 3-44.

Russell, William C.—The Mining of the Oil Shales, Colorado School of Mines Quarterly, October, 1922, Supplement B, pp. 45-49. also Railroad Red Book, December, 1922, pp. 1052-1055.

Simonds, K.—Gold Found in Oil Shale, Oil News, December 5, 1922, pp. 33-34.

Varley, Thomas.—Mines Bureau Investigates Gold in Oil Shale and Explains Methods Used to Obtain Results, Salt Lake Mining Review, November 30, 1922, pp. 9-12; also U. S. Bureau of Mines Investigation, November, 1922, No. 2413.

Winchester, Dean E.—Distribution and Importance of the Oil Shale Deposits of the United States, Colorado School of Mines Quarterly, October, 1922, Supplement B, pp. 51-52.

MANY PROTESTS FILED AGAINST RATES ON ORE

By McK. W. Kriegh

DURING JANUARY the number of railroad rate cases, involving raw and manufactured products of mines, in which formal complaints were filed with the Interstate Commerce Commission or in which some action was taken by the commission, exceeded one hundred. These cases cover a wide range of territory and embrace a variety of commodities. The unusual number of complaints alleging unreasonableness indicates general dissatisfaction with existing rate adjustments.

The reductions in freight rates last year apparently proved advantageous to the carriers as predicted by the shippers. Following these reductions the volume of freight traffic of the railroads measured in net ton miles, that is, the number of tons of freight hauled multiplied by the distance carried, increased materially. The increase in November, 1922, over the same month in 1921 was 31 percent. Revenues increased in November approximately 12 percent over those of the preceding November.

Of Partial Benefit Only

The reductions of last year, however, did not benefit the mining industry to the extent that other industries were stimulated. Therefore, the products of mines did not contribute as much to the increased volume of freight traffic as would have been the case if the rates on ores and smelter products had been restored to the level of rates in effect prior to May, 1918.

The railroads during the 11 months up to December, 1922, had a net operating income of $693,134,700 as compared with $565,974,000 during the same months of 1921. Operating revenues for the 11 months, January to November, inclusive, 1922, totaled $5,100,407,000, while operating expenses totaled $4,051,998,000. However, operating expenses were unusually high probably on account of repairs to equipment which had been allowed to deteriorate as the result of inadequate attention during preceding years.

During the period, reports showed a marked decrease in the number of locomotives and freight cars in need of repairs. Expenditures during November, 1922, for the maintenance of equipment totaled $122,012,900, an increase of 17 percent. over the same month in 1921. During this month the number of freight cars in need of repairs was reduced by 23,672, while there was reduction of 357 in the number of locomotives to be repaired. Figures for the whole year are not yet available but undoubtedly will reflect the same condition.

The roads contend that the rate of return on the commission's tentative valuation is less for 1922 than for 1921, but this is explained by the foregoing facts concerning increased expenditures for the purpose of reducing the amount of bad-order equipment, without considering the additional expense occasioned by the strike. If the number of bad-order cars and locomotives had been at a normal current basis, the rate of return would have been higher. Then, if there had been no strike, the rate of return doubtless would have been more than adequate.

Shortage is Declining

The car shortage is rapidly declining. On January 7, 20,426 surplus freight cars, in good repair and immediately available for use if traffic conditions warranted, were reported scattered throughout the country. The increase in the number of surplus freight cars is due to a falling off in the demand for practically all classes of equipment. The demand is said to be less now than at any time since September.

Complete reports indicate that the number of cars loaded with all commodities, other than coal, during 1922 was the greatest in railroad history, exceeding by 16 percent the total for 1921, and surpassing by 3½ percent that for 1920. Loading of agricultural products also was the heaviest on record, and loading of live stock exceeded loadings of 1921 and 1920. Shipments of merchandise and miscellaneous freight established a new record in 1922 when they totaled 27,143,591 cars. The volume of coal traffic during 1922 was below that of 1920 and 1921, due to the miners' strike.

It would seem proper to conclude that with coal traffic at a normal movement, with repairs to equipment at a current basis and with all other important traffic, except ores and smelter products, at a figure considerably in excess of the amount of tonnage hauled annually during previous years, the railroads should reach a stage very soon where further substantial reductions can be made in freight rates. The first to be considered for these reductions should be ores and smelter products, which are still in need of some action which will stimulate production.

BAUXITE IN 1922

DOMESTIC PRODUCTION of bauxite in 1922 was at least twice as large as in 1921 and may reach a total of not less than 300,000 long tons, according to James M. Hill, of the United States Geological Survey. This quantity is about half of that normally consumed, yet the increase in output is encouraging, for it reflects a larger demand by all the consuming industries, particularly the abrasives industry. The operations in the Arkansas and the eastern fields were larger, though in Arkansas car shortage in the fall limited to some extent the production.

During the first six months of 1922 the imports of bauxite averaged about 1,500 long tons a month, but since June they have been more than 3,000 tons a month. The prices of domestic dried bauxite ranged from $6 to $10 a ton, but were lower in the last half of the year. The prices of pulverized and dried bauxite have ranged from $12 to $15 a ton, and of calcined from $20 to $25 a ton.

E. H. PULLMAN

AS the present Congress is rapidly drawing to a close considerable legislation is occupying its attention before the curtain falls on March 4. Consideration is being given by both Houses to legislation of a varied character, while committees are attemtping to clear their calendars of all important measures.

The House has completed consideration of all the appropriation bills for the support of the government for the year beginning July 1 next and they are as rapidly being enacted by the Senate. Already six of the laws for separate departments have been enacted: Interior; State; Treasury; Justice; Labor; and Commerce. No other important bills have been considered by the House, attention being devoted to miscellaneous matters, although effort will probably be made to pass the proposed constitutional amendment to tax Federal and State securities and to change the law taxing capital gains and losses.

SILVER LEGISLATION

A bill was introduced to finance a soldier bonus by profits on the coinage of silver.

Hearings were given by the Senate Committee on Mines and Mining on a bill to create a silver commission to consider extended use of silver in world coinage.

Both Houses of Congress passed a bill which upon approval by the President will become a law authorizing the coinage of 300,000 fifty cent pieces in commemoration of the 100th anniversary of the enunciation of the Monroe doctrine.

A bill was introduced authorizing the Treasury Department to melt or break up and sell as bullion 350,000,000 standard silver dollars. While it is understood this bill was intended to provide for additional purchase of silver under the Pittman law at $1 per ounce, it is stated that the Treasury Department already has authority to break up and sell more than 270,000,000 silver dollars which were sold during the war, but that difficulty would lie in the sale of such silver at $1 per ounce.

To provide for circulation of silver dollars in the west, where paper money seems to predominate, notwithstanding it is the source of silver, a bill was introduced to transfer at least 40,000,000 silver dollars for circulation in western states. The purpose is also to encourage the use of silver throughout the country.

MINE BILLS

The proposed revision of mining laws has faded out of the picture for this session, the House Committee on Mines and Mining having definitely decided not to act on it.

Another measure which has had committee consideration but which is not expected to advance further is the bill proposing substitution of the present gold dollar by a flexible dollar based on commodity prices.

The Senate Committee on Interstate Commerce has reached no conclusion on the Blue Sky bill on which hearings were held and to which opposition was made by mining interests, headed by representatives of the American Mining Congress. Indications are that the committee will not act on the bill this session.

A measure was presented to suspend the annual assessment work on unpatented mining claims during the years commencing July 1, 1922, and ending July 1, 1924, on claims which are inaccessible by roads. It is understood, however, that the House Committee on Mines and Mining, to which it was referred, is not disposed to recommend its passage.

The sale of lands containing gilsonite, etc., in the former Uncompahgre Indian Reservation in Utah was proposed in a bill.

LABOR SHORTAGE

Based on the shortage of labor in the mining industry, a bill was introduced for an investigation of the immigration question by a committee of three members of the Senate Immigration Committee with a view of relieving the shortage by selection of immigrants.

Another immigration measure presented contemplates authorization being given to the Department of Labor to admit aliens in excess of the quota now fixed by law to meet labor shortages.

COAL STORAGE

To encourage storage of coal, bills were introduced seeking to abolish state taxes on coal in storage.

The Coal Commission submitted to Congress its preliminary report as required by law which covered a review of recent difficulties in the mining industry and which suggests storage of coal. Legislative recommendations will be deferred by the commission until its final reports on the anthracite industry in July and bituminous in September.

The House Committee on Interstate Commerce has not taken action on bills proposing an embargo on coal exports although the matter has been agitated in House speeches by Massachusetts Representatives.

Legislation was enacted authorizing the purchase of land for the government fuel yards, which distribute coal to government departments in Washington, which means the permanent establishment of this institution under the Bureau of Mines. The fuel yards were established during the war on leased premises.

TAX MEASURES

Although new tax proposals have been advanced, the House Committee on Ways and Means has decided in view of the fact that the new tax law has only been in operation a short time and the shortness of the session, it will not consider tax measures except those of an emergency character or of direct assistance to the treasury. These will include a bill, the committee reported, amending the revenue law concerning capital gains and losses by providing a tax of 12½ percent on gains and limiting to 12½ percent deduction on account of capital losses.

A bill was introduced providing that net loss after December 31, 1919, shall be deducted from net income for the preceding year, designed to remove discrimination against taxpayers who suffered losses in 1920.

Bills were also introduced amending the revenue law concerning credits for

IMPORTANT BILLS REVIEWED IN THIS ISSUE

SILVER—

S. Con. Res. 31: By Mr. Nicholson, Colo. (Increased Coinage)

H. Con. Res. 77: By Mr. Colton, Utah. (Increased Coinage)

H. R. 13883: By Mr. Sinclair, N. D. By request. (Coinage for soldier bonus)

H. R. 13809: By Mr. Gernerd, Pa. (Silver Coins)

S. 4277: By Mr. King, Utah. (Bullion Sale)

S. 4337: By Mr. Smoot, Utah. (Silver for West)

MINING—

H. R. 13606: By Mr. McArthur, Ore. (Mine Assessment)

S. 4300: By Mr. King, Utah. (Gilsonite)

S. J. Res. 265: By Mr. Smith, S. C. (Arsenate Purchase)

H. J. Res. 420: By Mr. Stevenson, S. C. (Arsenate Purchase)

S. 4243: By Mr. Bursum, N. M. (Minerals to Germany)

H. R. 31608: By Mr. Williams, Ill. (Minerals to Germany)

H. R. 10698: By Mr. King, Utah. (Blue Sky)

COAL—

H. Con. Res. 79: By Mr. Appleby, N. J. (Storage Tax)

S. Res. 400: By Mr. Pomerene, Ohio. (Ship Fuel)

H. R. 13832: By Mr. Winslow, Mass. (Fuel Plants)

TAXATION—

H. R. 13740: By Mr. Tincher, Kans. (Net Loss)

H. R. 13770: By Mr. Mills, N. Y. (Capital Gain and Loss)

H. R. 13659: By Mr. Frear, Wis. (Excess Profits)

H. R. 13633: By Mr. Turner, Tenn. (Producers Exemption)

INDIAN LEASES—

H. R. 13777: By Mr. Leatherwood, Utah. (Royalties to Indians)

S. J. Res. 267: By Mr. Harreld, Okla. (Royalties to State)

H. R. 9405: Committee Report. (Royalty Fee)

refund of excess tax payment and exchange of properties.

Another soldier bonus bill made its appearance, attached to which is a provision for reenactment of excess profits and war profits tax effective January 1, 1922, excluding, however, gold mining corporations.

Miscellaneous

Funds for engineering investigations on the Colorado River were recommended by the House Committee on Irrigation.

A measure appropriating $10,000,000 for purchase and sale by the government of calcium arsenate and nitrate of soda was passed by the Senate.

Consideration has been given by the House Committee on Public Lands to bills authorizing leases in the Red River Region to those who were dispossessed by the Supreme Court decision that these lands were not subject to mining entry.

A bill was reported by the House Indian Committee authorizing the collection by the government of not more than 3 percent from royalties or rentals of Indian lands leased for mining purposes.

Bills were introduced covering sales and contracts in interstate commerce.

The House Judiciary Committee reported that charges on which it was sought to impeach Attorney General Daugherty were insufficient. These charges involved alleged failure to prosecute suits against oil companies in California who were alleged to have illegally acquired oil lands.

Loans to Germany by which that country could purchase raw materials including phosphate and other minerals in the United States were proposed in bills introduced in the Senate and House.

Hearings were held by the Senate Judiciary Committee on a proposed constitutional amendment to prohibit child labor.

A bill was introduced for investigation by a congressional commission of plans for utilizing all the resources of the country in case of war.

A proposal to reduce import duties by 10 percent on goods transported in American ships was proposed in connection with the ship subsidy bill.

The Senate seems to be unable to reach a vote on the ship subsidy bill and has advanced consideration of agricultural credit legislation.

The Senate Committee on Manufactures has been active in its investigation of oil and gasoline prices, hearing a considerable number of men in the industry. Upon conclusion of the hearings, the committee will report to the Senate.

SILVER

(Increased Coinage)

S. Con. Res. 31. Introduced by Mr. Nicholson (Rep., Colo.). Referred to the Committee on Mines and Mining. This resolution proposes a silver commission to investigate the use of silver in monetary coinage of the world. It provides as follows:

"Whereas the production of silver in the United States is a large and important industry affecting the welfare of important communities and of a large number of citizens;

"Whereas the United States has throughout its history favored silver as an important element of its monetary system and views with anxiety the recent tendency of many influential nations to lessen the use of silver as money, in some cases by ceasing its coinage for subsidiary and fractional denominations and in other cases by diminishing the silver contents of coins of the same nominal value;

"Whereas such tendencies, if unchecked, will have a serious and far-reaching effect upon the monetary customs of the world and will directly and indirectly injure one of the world's greatest industries—that of mining;

"Whereas the subject is complex, requiring investigation of many abtruse

and difficult problems and their consideration by many nations: Be it resolved that:

"The President is authorized to appoint a commission of nine, to be known as a 'Silver Commission,' of whom not more than three shall be members of the Senate and not more than three members of the House:

"The Commission is authorized to communicate with nations either individually or in a joint conference:

"The Commission would use its influence toward resumption of the use of silver in the various monetary systems of nations which have abandoned or lessened its use and also lend its influence toward the adoption of any step that may tend to stabilize the value of silver in the world's market: and

"The Commission, after such investigation and conferences, would report to the President its recommendations and findings. No compensation would be allowed any member of the Commission, but its necessary expenses would be borne by the United States."

H. Con. Res. 77. Introduced by Mr. Colton (Rep., Utah). Referred to Committee on Mines & Mining. This resolution is similar to the foregoing.

(*Coinage for Bonus*)

H. R. 13883. Introduced by Mr. Sinclair (Rep., N. D.). (By request.) Referred to Committee on Ways and Means. This bill proposes a soldier bonus to be met by profit on coinage of silver. The silver provisions of the measure are as follows:

"The Secretary of the Treasury shall ascertain the average daily market value of silver bullion as measured in gold coin for the period commencing January 1, 1893, and ending January 1, 1918.

"That the average value of bar silver computed and ascertained for said period shall be fixed as the bullion value of bar silver delivered at mints.

"That the Secretary shall purchase all pure bar silver offered at any mint at the price fixed.

"That for each three hundred and seventy-one and one-fourth grains of one thousand fine silver purchased by the Secretary there shall be issued a coin certificate which shall be redeemable in either gold or silver coin, at the option of the Secretary.

"That the coin certificates issued under this act shall be full legal tender.

"That the Secretary shall coin all of said silver bullion into standard silver dollars of the weight and fineness as now prescribed by law, and as fast as the redemption of coin certificates shall be demanded.

"That the Secretary shall continue to coin subsidiary silver coin at the present ratio of weight and fineness and shall set aside silver bullion for coinage in subsidiary coin in the manner provided by law.

"That the Secretary shall ascertain the difference between the price fixed for the purchase of silver bullion and the coinage value of the bullion purchased if coined into standard silver dollars and subsidiary silver coin shall be designated as silver coinage seigniorage.

"That 95 percent of the silver coinage seigniorage or gain derived by converting silver bullion into standard silver dollars shall be set aside as a fund for the payment of the bonus and pensions.

"That 5 per centum of the seigniorage or gain derived shall be exchanged for gold coin of the Treasury and set aside as a gold redemption fund for the redemption of the coin certificates herein authorized.

"That all profits under the Federal Reserve Bank act shall be collected by the Secretary in gold coin and placed in the redemption fund and held for the purpose of redeeming coin certificates herein authorized and provided, and also United States notes and bonds."

(*Half Dollars*)

H. R. 13809. Introduced by Mr. Gernerd (Rep., Pa.). Referred to the Committee on Coinage. This bill authorizes the coinage of 300,000 fifty-cent pieces in commemoration of the three hundredth anniversary of the settling of the Middle States in 1624.

(*Bullion Sale*)

S. 4277. Introduced by Mr. King (Dem., Utah). Referred to the Banking Committee. This bill amends the Pittman silver purchase act of 1918 by directing the Treasury Department to melt or break up and sell as bullion 350,000,000 silver dollars, including dollars which have been already melted or broken up under the Pittman act, which amounted to 270,000,000 silver dollars. The bill provides for the sale of the bullion derived from breaking up or melting of the silver dollars as provided under the Pittman act.

(*Silver for West*)

S. 4337. Introduced by Mr. Smoot (Rep., Utah). Referred to the Committee on Finance. This bill appropriates $25,000 for the payment of transportation charges on standard silver dollars for use in Western States where paper currency is largely in circulation.

MINING

(*Assessment Suspension*)

H. R. 13606. Introduced by Mr. McArthur (Rep., Ore.). Referred to the Committee on Mines and Mining. This bill provides for suspension of the assessment work on unpatented mining claims for the years commencing July 1, 1922, and ending July 1, 1924, on all unpatented claims inaccessible to roads or highways to which supplies and equipment must be transported.

(*Gilsonite*)

S. 4300. Introduced by Mr. King (Dem., Utah). Referred to the Committee on Public Lands. This bill authorizes the sale in 40-acre tracts of lands in the former Uncompahgre Indian Reservation, Utah, containing gilsonite, asphaltum, elaterite, or other like substances.

(*Arsenate Purchase*)

S. J. Res. 265. Introduced by Mr. Smith (Dem., S. C.); passed by the Senate. It seeks to stimulate crop production by purchase and sale by the government of $10,000,000 worth of nitrate of soda and calcium arsenate.

H. J. Res. 420. Introduced by Mr. Stevenson (Dem., S. C.). Referred to the Committee on Agriculture. This is similar to the foregoing.

(*Minerals to Germany*)

S. 4243. Introduced by Mr. Bursum (Rep., N. Mex.). Referred to the Committee on Finance. This bill proposes to stimulate trade by providing credit to enable Germany to purchase raw materials, including phosphates and other minerals, in the United States. The Secretary of the Treasury would be authorized to pay to persons the purchase price of raw materials purchased in this country by Germany. These credits would not exceed $50,000,000 per month, $350,000,000 per year, and not more than a total of $1,000,000,000. Germany would issue securities for the credit at 5 percent interest payable in 10 years, and the United States government would issue bonds for the credits at 5 percent interest.

H. R. 13608. Introduced by Mr. Williams (Rep., Ill.). Referred to the Banking Committee. This bill is similar to the foregoing.

(*Blue Sky*)

H. R. 10598. Amendment by Mr. King (Dem., Utah). This proposes to exempt from the blue sky law any security authorized by a public commission, board, or officer of any state having power to examine, supervise, regulate, and control the issuance of securities.

COAL

(*Storage Tax*)

H. Con. Res. 79. Introduced by Mr. Appleby (Rep., N. J.). Referred to the Committee on Interstate Commerce. This resolution requests the states to exempt from taxation all fuel coal of any kind and character in storage within their boundaries. The resolution is based on the fuel shortage, which Mr. Appleby says indicates that some steps must be taken toward accumulation of fuel reserves to stabilize the industry and protect consumers. The resolution

says seasonable demand for coal can be met by storage at points near large centers of consumption; that the practice of distributing agencies, railroad companies, corporations, and individuals in storing coal during the summer has practically been discontinued largely because of local taxes on storage stocks; and that the creation of storage piles of coal would benefit trade and facilitate steadiness of operation of the mines.

(*Ship Fuel*)

S. Res. 400. Introduced by Mr. Pomerene (Dem., Ohio); adopted by the Senate. This calls for a report by the Shipping Board as to the cost of equipping vessels with Diesel engines; the saving in fuel capacity; and cost of fuel as compared with the fuel capacity and cost of coal or oil under present equipment.

(*Fuel Plants*)

H. R. 13832. Introduced by Mr. Winslow (Rep., Mass.). Referred to the Committee on Interstate Commerce. This bill, which was recommended by the War Department, authorizes the lease by the government for private operation of oil and coaling plants at Cristobal and Balboa, Canal Zone.

TAXATION

(*Net Loss*)

H. R. 13740. Introduced by Mr. Tincher (Rep., Kans.). Referred to the Committee on Ways and Means. This bill amends section 204 of the revenue act by providing that if for any taxable year beginning after December 31, 1919, any taxpayer has sustained a net loss, it shall be deducted from the net income for the preceding taxable year.

(*Gain and Loss*)

H. R. 13770. Introduced by Mr. Mills (Rep., N. Y.). Reported by the Committee on Ways and Means. This bill amends section 206 of the revenue act to become effective January 1, 1923, by providing 12½ percent as the basis of the tax or deduction of tax for capital gain and capital loss.

(*Excess Profits*)

H. R. 13659. Introduced by Mr. Frear (Rep., Wis.). Referred to the Ways and Means Committee. This bill provides that the soldier bonus be met by reenactment of the war profits and excess profits taxes.

(*Producers Exemption*)

H. R. 13633. Introduced by Mr. Turner (Dem., Tenn.). Referred to the Committee on Ways and Means. This bill proposes to exempt from taxation the value of the direct products of the soil in the hands of the producer or the proceeds of sale of such products to the amount of $5,000.

INDIAN LEASES

(*Royalties to Indians*)

H. R. 13777. Introduced by Mr. Leatherwood (Rep., Utah). Reported by the Indian Affairs Committee. This bill provides that the Interior Department shall pay at the end of each quarter to each adult member of the Osage Indian tribe his share of bonuses, and royalties from land leases.

(*Royalties to State*)

S. J. Res. 267. Introduced by Mr. Harreld (Rep., Okla.). Referred to the Committee on Public Lands. This resolution proposes that one-half of the bonuses and royalties received by the government from leases or permits for oil and gas development in Oklahoma shall be paid to the state, and that one-half of the royalties reserved by the government shall also be paid to Oklahoma, the latter for the benefit of schools and highways.

(*Royalty Fee*)

H. R. 9405. Reported by the House Indian Committee. This bill authorizes the collection of not more than 3 percent by the Interior Department as a fee from Indian lessors for moneys collected as royalties and rentals from leases of restricted Indian lands for mining purposes. The purpose of the bill is to require the Indians to contribute to the cost of administering their funds. It is estimated the bill would yield the government $120,000 annually. It has the approval of the Interior Department.

INDUSTRIAL NOTES

A new and revised edition of the Blasters' Handbook, in attractive form, has just been issued by E. I. du Pont de Nemours & Company. It was compiled under the direction of the manager of the company's technical section, and is especially valuable at this time to all users of explosives, because it reviews blasting practice in every phase and gives the most approved methods of employing dynamite and black powder based on actual field use.

The book is profusely illustrated, showing proper methods of employing explosives under a great many different conditions.

"How National Advertising Gives You the Benefits of Co-operative Buying" is the subject of a reprint made by the William H. Rankin Advertising Agency of an article by H. A. Groth, which appeared recently as a trade magazine article. This pamphlet, containing important additions to the original, emphasizes the ability of correct advertising to secure stabilized quantity production for the manufacture and quick turnover in retail handling.

The Ingersoll-Rand Company is focusing interest upon its 6-H "Little Trigger" scraper, which is pointed out as being small enough to work in narrow drifts or cross-cuts and under low headings. It is simple, rugged, light and especially adapted for "slushing" as well as for use in balanced haulage in mines and for various hoisting operations.

The New York Engineering Company, New York City, is distributing an interesting booklet on the "Business of Gold Dredging," which, while describing many of the major dredging installations made by the company in recent years, is essentially a brief treatise on gold dredging as viewed from a business standpoint, and contains much data of material interest to those engaged in gold, tin or placer dredging operations.

An unusually attractive catalog has been issued by the Ohio Brass Company, Mansfield, Ohio, to describe and illustrate Crouse-Hinds Imperial Headlights for electric mining locomotives, for which the company is exclusive sales agent. The catalog enters into detail in describing the luminous arc, carbon arc, and incandescent headlights bearing the Crouse-Hinds trade-mark.

PLATINUM IN 1922

DURING THE first nine months of 1922 the imports of crude and unmanufactured platinum amounted to 72,410 ounces, which is nearly 11,000 ounces more than the imports during the whole of 1921. Colombia supplied about half the crude platinum that reached the United States, and some Russian platinum came in through England and other countries. As the domestic supply of platinum and related metals is now almost completely dependent on imports it is reasonable to expect a considerable increase in the quantity of new metals recovered by refiners. Stocks of platinum at the beginning of the year were about normal, amounting to 64,547 ounces. It would seem that as the jewelers had a better year in 1922 than in 1921 the recovery of secondary metals may reach at least 50,000 ounces. James M. Hill, of the Geological Survey, therefore estimates that about 200,000 ounces of platinum metals was available for consumption in 1922.

The large supply was reflected in the price of refined platinum, which throughout the most of the year was from $87.50 to $90 an ounce but which early in the fall advanced to $108. Palladium remained at $55 to $60 an ounce without fluctuation. The price of iridium was fairly regular at $160 to $175 an ounce until fall, when a shortage of supply caused a considerable advance in price.

ATTACK ON FEDERAL TRADE BODY FAILS

Efforts Launched on Floor of House to Slash Commission's Appropriations Are Voted Down—Officials of Agency Outline Work Before Committee

EFFORTS TO MAKE radical reductions in appropriations for the Federal Trade Commission for the coming fiscal year, made by legislators who are critical of that organization's accomplishments, were voted down on the floor of the House during recent debate on the bill providing funds for that agency. The discussion, however, offered those attacking the Commission an opportunity to make the prediction that, unless the agency's policies and activities are changed in character during the coming year, the next request for appropriations will find an abolition movement asserted.

In direct contrast to the tenure of opposition were statements made by officials of the Commission during committee hearings on the measure, when outlines of the work of the body were presented, together with details of some plans for the future.

Resume of Work

Testifying before the committee, Commissioner Murdock pointed to the Pittsburgh steel basing case as one of the major issues now commanding attention. "It is an intricate, complex thing," he declared. Men are divided about it. The commission was divided, but a complaint was issued and the matter is in process of trial."

Mr. Murdock devoted a portion of his statements before the committee to a résumé of the work the commission is doing in connection with an analysis of the world petroleum situation.

Swinging into discussion of the commission's cost-finding activities, he expressed doubt if it held authority to determine the spread between the cost of production and the sale prices of commodities. He stated that the commission never had been able to find what was responsible for the high price of coal. The difference between the mouth-of-mine price and the price at which the product was sold, he stated, was put on by multiple disserviceable reconsignments. Mr. Murdock told the committee experts are working on the draft of a bill to meet the situation, but added that a satisfactory proposal had not yet been reached.

Another Angle

The commissioner brought another angle into the discussion when he proposed that a law be enacted preventing government employes accepting business engagements in opposition to the interests of the government until from two to five years after they have left the federal service. Were such legislation passed, he declared, the commission would be able to maintain the highest plane of efficiency in its force.

Commissioner Van Fleet told the committee of the commission's activities in connection with the blue-sky situation, declaring that the agency desires quick action in fraudulent stock cases, he charged the existence of a "nest" of "questionable" oil stock companies in Texas, where, he declared, a special corps of agents should be stationed to relieve the situation.

Criticism of the commission came in the wake of a proposal by Representative Treadway that the House eliminate appropriations for $55,000 for salaries of the commission. This motion was rejected, as also was another proposing reduction of the commission's expenditure allowance from $880,000 to $780,000.

Intimates Another Effort

The intimation that unless the commission shifted its policies it would be faced by still further efforts aiming at its abolishment was included in Mr. Treadway's remarks.

Representative Wood, Indiana, expressed the belief that the work of the commission has shown an improvement, putting forward the criticism, however, that too much time is spent on small matters. He advised the commission to confine its activities to the encouragement of legitimate trade, and expressed his favor of some plan which would place large business men at the head of the organization. A defence of the commission was made by Representative London.

NEW PAPER IN ROCK MATERIALS SERIES

THE TECHNOLOGY of slate, by Oliver Bowles, mineral technologist, is the latest issue in a series of Bureau of Mines publications on rock materials, the first number of which was published by the Bureau of Mines in 1915. About two years were devoted to the preparation of the report, a work which included a careful study of about 65 active quarries and finishing plants. The process of manufacture of granules and slate flour is given in some detail with flow sheets of various mills. The book is illustrated with six plates and 41 text figures.

The descriptions and suggestions presented, it is hoped, may assist materially in establishing the industry on a more stable basis and in encouraging enlarged application of a natural product that possesses qualities justifying a much wider use.

Copies of this bulletin may be obtained from the Bureau of Mines, Washington, D. C.

MANGANESE REPORT IS MADE BY SURVEY

MANGANESE ORE containing 35 per cent or more of manganese shipped from domestic mines in 1922, according to figures compiled by the Geological Survey from reports of producers of manganese, amounted to about 13,500 gross tons, valued at $457,000. The ore of this grade shipped in 1921 amounted to 13,531 gross tons, valued at $495,097. The figures for 1922 represent the actual production for eleven months plus an estimate of the production in December. More than 10,000 tons of this ore was mined in Montana.

Effect of the New Tariff

The new tariff act, which became effective September 21, 1922, provides for a duty of $8 a ton on ore containing 40 percent of manganese, $9 a ton on ore containing 45 percent of manganese, $10 a ton on ore containing 50 percent of manganese, and so on. Manganese should therefore bring an average price on the eastern seaboard amounting to the present average price of foreign ore plus about $9 a ton. The new tariff has not yet greatly affected the domestic manganese market, for even under its provisions not many domestic mines can be operated at a good profit; but the owners of mines that have heretofore been worked profitably have shown a renewal of interest in the industry, and some of the mines that are already developed and that yield ore of high grade will probably be reopened.

Shipments by Grades

About 352,000 gross tons of ore containing 10 to 35 per cent of manganese, valued at about $1,232,000, was mined in 1922, as compared with 8,439 gross tons, valued at $42,755, in 1921. About 308,000 tons of the ore of this grade shipped in 1922 was mined in Minnesota.

About 251,000 gross tons of ore containing 5 to 10 percent of manganese, valued at about $630,000, was shipped from domestic mines in 1922, as compared with 62,670 gross tons, valued at $147,567, in 1921. About 248,000 tons of the ore of this grade shipped in 1922 was mined in Minnesota.

Up to September 21 manganese ore amounting to 266,969 gross tons, valued at $2,324,989, has been imported into the United States in 1922, most of it from Brazil.

LEAD AND ZINC INCREASES ARE TABULATED

THE mine and refinery output of lead in the United States in 1922 each made a good gain, and the mine and smelter output of zinc each increased about 70 percent, according to a statement by C. E. Siebenthal and A. Stoll, of the Geological Survey, compiled from reports and estimates by producers and others. Data for the Western States are taken from the advance statements issued by the Geological Survey's western offices. Statistics of imports and exports are taken from the records of the Bureau of Foreign and Domestic Commerce; the imports include only those for the period before the new tariff went into effect (January 1 to September 21), but the exports include the actual exports for ten months, plus an estimate for November and December.

Lead Mine Production

The output of soft lead by mines of the Mississippi Valley (including the small output of the Eastern States) was about 256,000 short tons, and that of argentiferous lead by mines of the Western States was about 208,000 tons, a total of 464,000 tons. The corresponding figures for 1921 were 237,209 tons from the Mississippi Valley and 172,491 tons from the Western States, a total of 409,700 tons. The imports of lead in ore under the old tariff from January 1 to September 21, inclusive, the only period for which figures are available, were 6,368 tons, furnished chiefly by Canada, Mexico, and South America, and those of lead in bullion were about 52,000 tons, almost wholly from Mexico, as compared with a total of 42,984 tons in 1921. The lead content of lead ore and base bullion in bonded warehouses on January 1 was 19,186 tons, all of which was withdrawn before September 22.

Zinc Mine Production

The recoverable zinc content of ore mined in 1922 was about 442,000 tons, as compared with 256,746 tons in 1921. The output of the Eastern States was about 90,000 tons (80 per cent from New Jersey), that of the Central States about 272,000 tons, and that of the western states about 80,000 tons, as compared with 67,711, 175,262, and 13,773 tons, respectively, in 1921.

The imports of zinc in ore for the period January 1 to September 21, inclusive, were 1,810 tons, as against 2,705 tons in the entire year 1921, most of which in both years was imported from Mexico. The zinc content of zinc ore in bonded warehouses on January 1, was 14,292 tons, all of which was withdrawn before September 22.

Smelter stocks of lead and zinc ore and concentrates were probably each reduced during the year.

Lead Refinery Production

The output of primary domestic desilverized lead in 1922 was about 181,000 short tons, of soft lead about 204,000 tons, and of desilverized soft lead about 76,000 tons, making a total output from domestic ores of about 461,000 tons of refined lead, as compared with 398,222 tons in 1921, which was made up of 187,962 tons of desilverized lead, 157,513 tons of soft lead, and 52,747 tons of desilverized soft lead. The output of lead smelted and refined from foreign ore and bullion was about 70,000 tons, as compared with 50,367 tons in 1921. The total lead smelted or refined in the United States was thus about 531,000 tons, as compared with 448,589 tons in 1921. The output of antimonial lead is reported to be about 6,500 tons, as against 10,064 tons in 1921. The exports of lead of foreign origin were about 35,000 tons and of lead of domestic origin about 5,500 tons, as compared with 34,369 tons and 1,624 tons, respectively, in 1921. The imports of refined pig lead of which statistics are available for the period under the old tariff only (January 1 to September 21, inclusive) were 2,500 tons, as compared with 31,301 tons in 1921 and 35,719 tons in 1920. From a total supply of about 533,000 tons of refined lead (exclusive of stocks) there was withdrawn for export about 38,000 tons, leaving 495,000 tons available for consumption in the United States, as against 444,872 tons in 1921 and 538,020 tons in 1920.

Zinc Smelter Production

The output of primary metallic zinc from domestic ores in 1922 was about 338,000 tons and from foreign ores about 1,000 tons, a total of 339,000 tons, as compared with 198,232 tons from domestic ores and 2,268 tons from foreign ores, a total of 200,500 tons in 1921. In addition to primary zinc there was an output of about 24,000 tons of redistilled secondary zinc, as compared with 17,573 tons in 1921.

The imports of foreign slab zinc up to September 21, when the new tariff went into effect—no later statistics being available—amounted to 45 tons, as compared with 6,739 tons in 1921. No American zinc was returned in 1922 as against 731 tons in 1921. Not included in the imports given above is 415 tons of sheet zinc imported and entered for consumption in the first nine months of 1922, as compared with 6,688 tons in 1921.

The exports of zinc made from foreign ores were about 2,600 tons and those of zinc made from domestic ores were about 28,000 tons, as compared with exports of 1,256 and 3,569 tons, respectively, in 1921.

IRON OUTPUT SHOWS LARGE 1922 GAIN

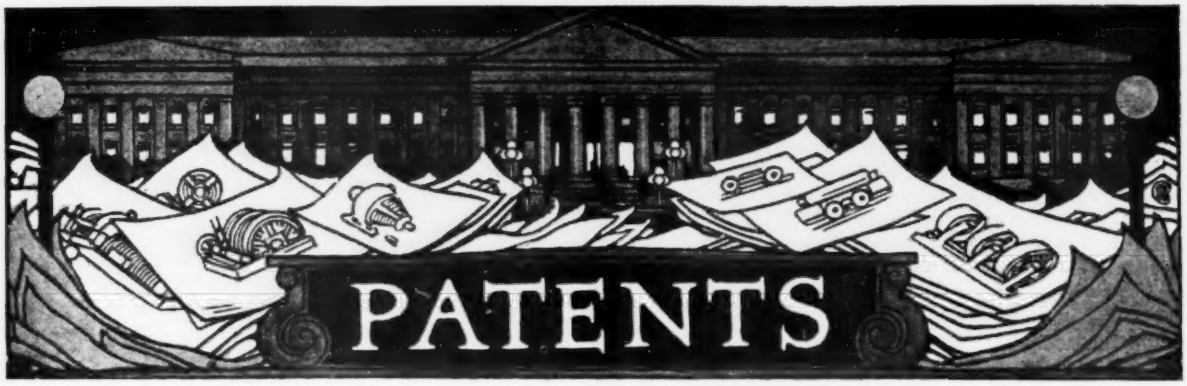
IRON ORE production in the United States in 1922, exclusive of ore that contained more than 5.5 percent of manganese, is estimated by the Geological Survey at 46,963,000 gross tons, an increase of 60 percent as compared with that mined in 1921. The ore shipped from the mines in 1922 is estimated at 50,046,000 gross tons, valued at $158,222,000, an increase of 88 percent in quantity and of 76 percent in value as compared with the figures for 1921. The average value of the ore per gross ton at the mines in 1922 is estimated at $3.16; in 1921 it was $3.37. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, apparently decreased from 13,836,267 gross tons in 1921 to 10,699,000 tons in 1922, or 23 percent.

These estimates, which are based on preliminary figures furnished by producers of 98 percent of the normal output of iron ore, were made by Hubert W. Davis, of the survey. They show the totals for the principal iron-ore producing states, and, by grouping together certain states, the totals for the Lake Superior district and for groups of southeastern and northeastern states.

IMPROVED OUTLOOK FOR GOLD IN AFRICA

THE outlook for 1923 in the African gold mining industry is far brighter than at the beginning of last year, according to reports reaching the Department of Commerce. Month by month, since the strike, gold production has steadily increased, the output for November being 764,476 fine ounces. Mining costs have been reduced and greater efficiency developed. The labor position in the mines is satisfactory. The number of natives employed at the end of November in the gold mines was 173,173, as compared with 175,129 for October. The report of the mining industry board, formed after the Rand strike to investigate the state of the mining industry, has now been issued and its findings lend strength to the position of the mining operators and managers. No wage increases are recommended and the action of the mining groups in effecting economies is upheld. The report, however, is secondary to the conciliation scheme proposed by the commission for the settlement of labor troubles, which went into effect on October 1.

Recently the diamond mines have resumed operations after having been shut down since the early part of 1921. It is understood that the Kimberly mines will restart production during January.



CONDUCTED BY JOHN BOYLE, JR.

1,425,187—*R. Ellis,* Oak Park, Ill., August 8, 1922.

PROCESS OF CONCENTRATING ORES whose metalliferous constituents include oxygen compounds of the metal to be separated which includes the separation of the said oxygen compounds from the other constituents of the ore by treating the comminuted ore with a fluid having a selective action for such oxygen compounds, and which further includes the use of a solution containing anions having a valence greater than two and cations having a valence greater than one for increasing the selective action of the fluid.

1,425,327—*R. Luckenbach,* Brooklyn, N. Y. Assigned to Luckenbach Processes, Inc., August 8, 1922.

FLOTATION PROCESS which comprises adding greasetar compounds of the distillation of greasewood to the ore pulp.

1,425,913—*H. R. Straight,* Adel, Iowa, August 15, 1922.

MINING MACHINE adapted to mining rock salt, sulphur and especially oil shale. On account of the viscous and elastic nature of oil shale, it is difficult to drill it with an ordinary drill, the drill having a tendency to bounce without materially cutting the shale. This machine cuts and breaks the shale into small chunks without too much fine material, and automatically elevates and delivers it to cars for transportation to a retort for distillation. Means are also provided for heating and softening the material at the cutter points, without materially volatilizing the contained hydrocarbon.

1,426,371—*A. Van Dura,* Chicago, Ill., August 15, 1922.

MINING SHEAVE comprising an arched base; a support formed centrally beneath said arched base, said support providing a bearing; and a sheave roller mounted in said bearing.

1,426,637—*A. L. Hawksworth,* Butte, Mont., August 22, 1922.

DRILL BIT provided with cutting legs terminating at their outer ends in cutting surfaces having circumferentially extending wings the peripheral surfaces of said legs being recessed.

1,427,118, 1,427,119—*E. C. Morgan,* New York City, August 29, 1922.

MINING AND LOADING MACHINE comprising a supporting frame, a loop chain core cutter comprising a cutter frame having an unobstructed core-opening therethrough for guiding the chain around the core cut by said cutter, means for operating said cutter including arcuate feed thereof to cut an arcuate core, and means in position for carrying the cut core of material in an arcuate path away from the mine wall immediately after being cut by said cutter.

1,427,232—*A. Schwarz,* Joplin, Mo. Assigned to Metal Recovery Co., August 29, 1922.

FLOTATION AGENT. By subjecting various selective agents, including many substances of an oily or resinous nature to an extraction process with aqueuous extracting liquors, and by separating the extracted constituents from the unextracted constituents, and by using the thus extracted constituents, either with or without the addition thereto, in predetermined amounts, of the unextracted constituents, it is possible to obtain higher grade concentrates and a better separation generally; and that it is thus possible to effect the concentration of ores with greater reliability than heretofore usually possible.

1,427,234—*D. V. Shervin,* Canton, Ohio, August 29, 1922.

PULVERIZING MILL for coal having means for screening and carrying off the fine dust, as it is produced, from the interior of the drum and for maintaining and protecting such means.

1,427,609—*A. L. McDonald,* Woodlawn, Pa., August 29, 1922.

MINING TOOL adapted to ream the inner end of a blasting hole for enlarging it. When the bore is enlarged by a lateral cavity extending all around the central bore and with a flat front wall on a plane at right angles to the axial center of the bore, the explosive charge of powder or the like, being confined between the rear and front walls of the enlarged cavity, surrounding the central bore hole, will act with very great force against the front wall particularly, and will break the coal, etc., outwardly and laterally on diverging lines.

1,427,651—*J. J. Steinbach,* Scranton, Pa. Assigned to Wilmot Engineering Co., August 29, 1922.

COAL JIG provided with means for holding and guiding the movements of the lower ends of the bars or like devices by means of which the jig pan is supported upon eccentrics or other actuating means upon the actuating shaft, the said ends terminating a distance below the said pan. By thus holding the lower ends of said bars or other like devices, or by otherwise holding the jig pan, rotation of the said eccentrics or equivalents therefor upon and from which the jig pan is suspended, a gyratory movement of the said pan is effected.

1,434,386—*A. F. Hilleke,* Birmingham, Ala., November 7, 1922.

APPARATUS FOR CONCENTRATING ORES specially suited for the separation of the fine particles of iron oxide in crushed iron ore from the larger particles of silica and other foreign matter of lower specific gravity than the iron, to the end that the loss of iron in the tailings may be reduced and that a product may be obtained by nodulizing and sintering. The chief problem encountered is that involved in the separation in a water or liquid bath of the small heavier particles of iron ore from the larger but lighter particles of silica and the principle is utilized of suspending the finer particles in a concentrating tank by the control and direction of the currents in the bath to the end that a substantial percentage of the fines are discharged in concentrated form ready for use, and that the fine iron ore tending to pass off with the coarser foreign matter is washed on the latter and delivered in part to the tank or other separating means and in part as a semi-concentrated product to the Wilfley table or other separator, where the separating process is finished.

1,435,130—*J. P. Hogan,* Denver, Colo., November 7, 1922.

ORE GRINDING DISC having a flat finishing surface adjacent to the circumference, and non-radial grooves extending from a central eye or space to the flat surface, the ridges and grooves acquiring height and width as they approach the flat surface, the tops of the ridges and the bottoms of the grooves having plane surfaces.

1,435,137—*M. P. Holmes,* Claremont, N. H., November 7, 1922, assigned to the Sullivan Machinery Co.

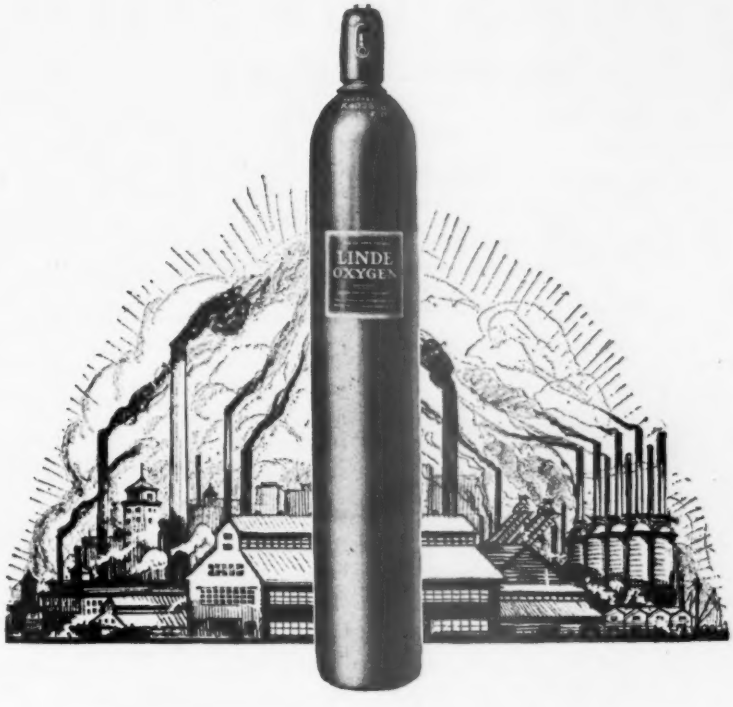
MINING APPARATUS specially adapted for use in kerf cutting, whereby the angle of the cutting apparatus may be varied with respect to the bottom and wherein the elevation of the cutting apparatus may likewise be adjusted.

1,435,180—*W. A. Schlessinger,* Denver, Colo., assigned to the Radium Company, November 14, 1922.

PROCESS OF TREATING CARNOTITE to extract therefrom its radioactive constituents, the step which consists in heating the ore with soda ash under pressure in the presence of moisture.

1,435,303—*A. L. Jennings and J. F. Dolan,* Perth Amboy, N. J., November 14, 1922.

REMOVING IMPURITIES FROM TIN ORE before the ore is smelted by fusing the tin ore with an alkaline metal acid sulfate.



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Williamsport Wire Rope Co., 1301 Peoples Gas Bldg., Chicago, Ill.

AIR COMPRESSORS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

ALTITUDE VALVE
Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Pa.

AMALGAMATORS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

APPLIANCES, ENGINEERING
Lunkenheimer Co., Cincinnati, Ohio.

ARMATURES
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ASSAYERS
Pennsylvania Smelting Co., Pittsburgh, Pa.

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AUTOMATIC COAL SKIP
Roberts & Schaefer Co., McCormick Bldg., Chicago, Ill.

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American Mine Door Co., Canton, Ohio.

BAROMETERS
Taylor Instrument Companies, Rochester, N. Y.

BATTERY-CHARGING EQUIPMENT
General Electric Co., Schenectady, N. Y.

BELTING (Conveyor, Elevator, Transmission)
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

BELTING, SILENT CHAIN
Morse Chain Co., Ithaca, N. Y.

BINS (Coke and Coal)
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

BIT SHARPENERS
Denver Rock Drill Mfg. Co., Denver, Colo.
Ingersoll-Rand Co., 11 Broadway, New York City.

BLASTING POWDER
Hercules Powder Co., 934 King St., Wilmington, Del.

BLASTING SUPPLIES
du Pont Powder Co., The E. I., Wilmington, Del.
Hercules Powder Co., 934 King St., Wilmington, Del.

BLOWERS
General Electric Co., Schenectady, N. Y.

BLOWERS' CENTRIFUGAL
Ingersoll-Rand Co., 11 Broadway, New York City.

BOILER MOUNTINGS
Lunkenheimer Co., Cincinnati, Ohio.

BOILER STOP AND CHECK VALVE
Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Pa.

BOILERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis. (feed pump).

BOXES, JOURNAL
J. R. Fleming & Son Co., Inc., Scranton, Penna.

BREAKERS (Construction and Machinery)
Jeffrey Mfg. Co., Columbus, Ohio.
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Wilmot Engineering Co., Hazleton, Pa.

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Jeffrey Mfg. Co., Columbus, Ohio.
Traylor Eng. & Mfg. Co., Allentown, Penna.

BUCKETS (Elevator)
Jeffrey Mfg. Co., Columbus, Ohio.

CABLES (Connectors and Guides)
American Mine Door Co., Canton, Ohio.

CABLEWAYS
Jeffrey Mfg. Co., Columbus, Ohio.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.

CAGE (Safety Appliances)
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

CAGES
Car-Dumper & Equipment Co., Chicago, Ill.
Connellsville Mfg. & Mine Supply Co., Connells ville, Pa.
Holmes & Bros., Robert, Inc., Danville, Ill.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.

CAR CONTROL AND CAGE EQUIPMENT
Car-Dumper & Equipment Co., Chicago, Ill.

CAR DUMPS
Car-Dumper & Equipment Co., Chicago, Ill.

CAR AND CAR WHEELS
Hockensmith Mine Car Co., Penn Station, Pa.

CAR-HAULS
Car-Dumper & Equipment Co., Chicago, Ill.

CASTINGS
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
The Lunkenheimer Co., Cincinnati, Ohio.

CHAINS
Jeffrey Mfg. Co., Columbus, Ohio.
Morse Chain Co., Ithaca, N. Y.

CHAINS, AUTOMOBILE ENGINE
Morse Chain Co., Ithaca, N. Y.

CHAINS, DRIVE
Morse Chain Co., Ithaca, N. Y.

CHAINS, FRONT END
Morse Chain Co., Ithaca, N. Y.

CHAINS, OILING
Morse Chain Co., Ithaca, N. Y.

CHAINS, POWER TRANSMISSION
Morse Chain Co., Ithaca, N. Y.

CHAINS, SILENT (Rocker-Joint)
Morse Chain Co., Ithaca, N. Y.

CHAINS, SLING
Morse Chain Co., Ithaca, N. Y.

CHAINS, SPROCKET WHEEL
Morse Chain Co., Ithaca, N. Y.

CHEMICALS
Roessler & Hasslacher Chemical Co., 709-717 Sixth Avenue, New York.

CHEMISTS
Hunt, Robt., & Co., Insurance Exchange, Chicago, Ill.

CIRCUIT BREAKERS
General Electric Co., Schenectady, N. Y.

CLAMPS (Trolley)
Ohio Brass Co., Mansfield, Ohio.

CLUTCHES
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

COAL COMPANIES
Clinchfield Coal Corp., Dante, Va.
Lehigh Coal & Navigation Co., Philadelphia, Pa.
Stonega Coal & Coke Co., Philadelphia, Pa.
Thorne, Neale & Co., Philadelphia, Pa.
Wholesale Coal Co., Pittsburgh, Pa.

COAL CRUSHERS
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Jeffrey Mfg. Co., Columbus, Ohio.

COAL CUTTERS
Goodman Mfg. Co., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, Ohio.

COAL DRYING PLANTS
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL HANDLING MACHINERY
Jeffrey Mfg. Co., Columbus, Ohio.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL MINING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Goodman Mfg. Co., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.
Jeffrey Mfg. Co., Columbus, Ohio.
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL MINE POWER PLANTS
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL MINING PLANTS
Ingersoll-Rand Co., 11 Broadway, New York City.
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COAL WASHING PLANTS
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

COCKS (Locomotive, Cylinder and Gauge)
The Lunkenheimer Co., Cincinnati, Ohio.

COILS (Choke)
General Electric Co., Schenectady, N. Y.

COMPRESSORS, AIR
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York City.

COMPRESSORS, MINE CAR
Ingersoll-Rand Co., 11 Broadway, New York City.

CONCENTRATORS (Table)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CONCRETE REINFORCEMENT
American Steel & Wire Co., Chicago and New York.

CONDENSERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Ingersoll-Rand Co., 11 Broadway, New York City.

CONSULTING ENGINEERS
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

CONTRACTORS
Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

CONTROLLERS
General Electric Co., Schenectady, N. Y.
Goodman Manufacturing Co., Halsted St. and 48th Place, Chicago, Ill.

CONVERTERS, COPPER
Traylor Eng. & Mfg. Co., Allentown, Penna.

CONVEYORS, BELT
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

CONVEYORS, CHAIN FLIGHT
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Wilmot Engineering Co., Hazleton, Pa.

CONVEYORS, COAL
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Lidgerwood Mfg. Co., 96 Liberty St., New York City.

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Jeffrey Mfg. Co., Columbus, Ohio.

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United Metals Selling Co., 42 Broadway, New York City.

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Anaconda Copper Mining Co., 111 W. Washington St., Chicago, Ill.

CORE DRILLING
H. R. Ameling Prospecting Co., Rolla, Mo.

Hoffman Bros., Punxsutawney, Pa.

CRUSHERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

CRUSHERS, COAL
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

CRUSHERS, JAW AND GYRATORY
Traylor Eng. & Mfg. Co., Allentown, Penna.

CRUSHING PLANTS, COKE
Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

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American Cyanamid Co., New York, N. Y.

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Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

Roberts & Schaefer Co., Wrigley Bldg., Chicago, Ill.

DIAMOND CORE DRILL CONTRACTING
H. R. Ameling Prospecting Co., Rolla, Mo.

Hoffman Bros., Punxsutawney, Pa.

DOORS, AUTOMATIC MINE
American Mine Door Co., Canton, Ohio.

DRAG LINES
Denver Rock Drill Mfg. Co., Denver, Colo.

Williamsport Wire Rope Co., Gen. Sales Office, 1301 Peoples Gas Bldg., Chicago, Ill.

DREDGES, GOLD AND TIN
New York Engineering Co., 2 Rector St., New York City.

DRIFTERS, DRILL
Denver Rock Drill Mfg. Co., Denver, Colo.

Ingersoll-Rand Co., New York City.

DRILLS, AIR AND STEAM
Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLS (Blast Hole)
Denver Rock Drill Mfg. Co., Denver, Colo.

Ingersoll-Rand Co., New York City.

DRILLS, CORE
H. R. Ameling Prospecting Co., Rolla, Mo.

Hoffman Bros., Punxsutawney, Pa.

Ingersoll-Rand Co., New York City.

DRILLS, ELECTRIC
General Electric Co., Schenectady, N. Y.

Ingersoll-Rand Co., New York City.

Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.

DRILLS, HAMMER
Denver Rock Drill Mfg. Co., Denver, Colo.

Ingersoll-Rand Co., New York City.

DRILLS (Hand Operated Coal)
Ohio Brass Co., Mansfield, Ohio.

Ingersoll-Rand Co., New York City.

DRILLS, PNEUMATIC
Denver Rock Drill Mfg. Co., Denver, Colo.

Ingersoll-Rand Co., New York City.

DRILLS, PROSPECTING
H. R. Ameling Prospecting Co., Rolla, Mo.

Hoffman Bros., Punxsutawney, Pa.

Ingersoll-Rand Co., 11 Broadway, New York City.

New York Engineering Co., 2 Rector St., New York City.

DRILLS, ROCK
Denver Rock Drill Mfg. Co., Denver, Colo.

General Electric Co., Schnectady, N. Y.

Ingersoll-Rand Co., New York City.

DRILL STEEL SHARPENERS
Denver Rock Drill Mfg. Co., Denver, Colo.

Ingersoll-Rand Co., 11 Broadway, New York City.

DRIVES, SILENT CHAIN
Morse Chain Co., Ithaca, N. Y.

DRUMS (Hoisting, Haulage)
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

DRYERS, ORE
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DUMPERS, ROTARY
Car-Dumper & Equipment Co., Chicago, Ill.

DUMP CARS
Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

DYNAMITE
Atlas Powder Co., Wilmington, Del.

du Pont Powder Co., The E. I., Wilmington, Del.

Hercules Powder Co., 934 King St., Wilmington, Del.

DYNAMOS
General Electric Co., Schenectady, N. Y.

Goodman Mfg. Co., Forty-eighth Place and Halsted St., Chicago, Ill.

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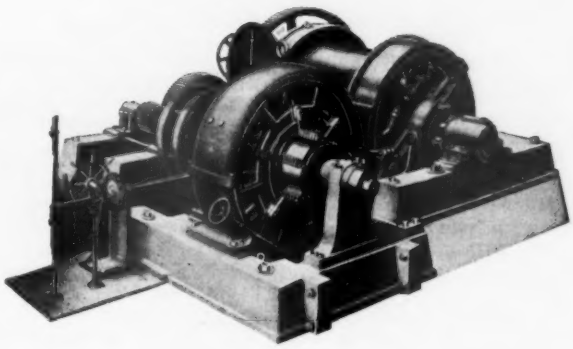

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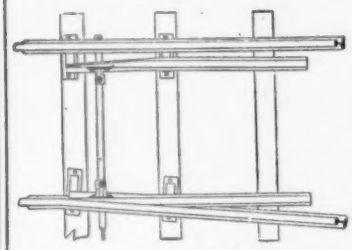

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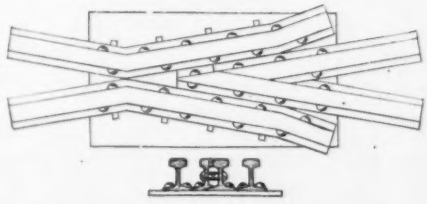

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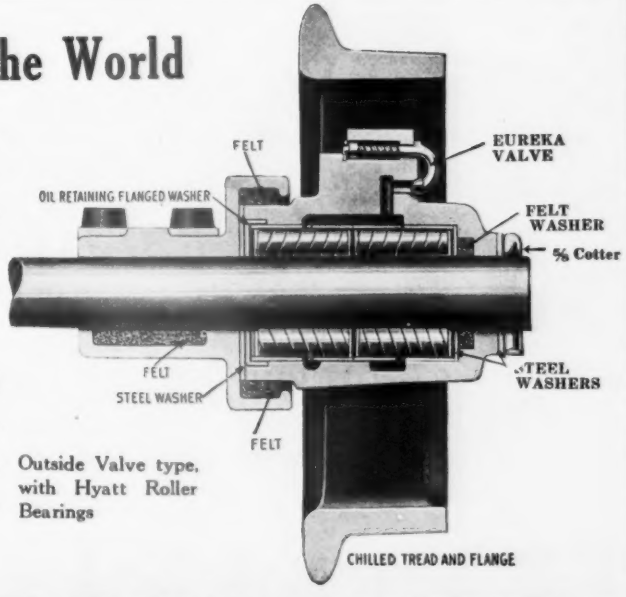

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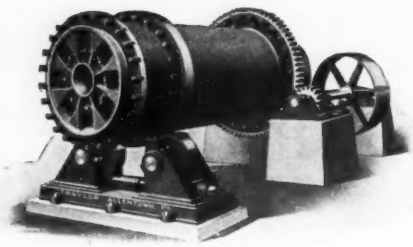

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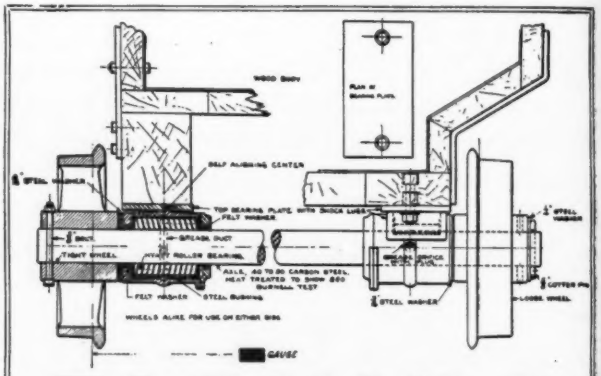

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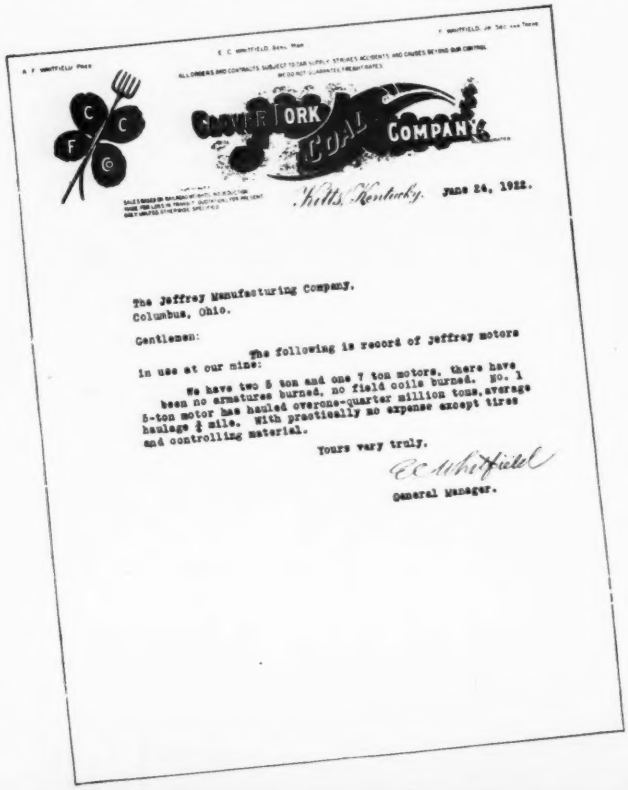

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